ELECTRICAL REVIEW

[ILLUSTRATED.]

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Johnson's Electro-Pneumatic Valve.

BY C. C. HASKINS.

The constantly increasing adoption of steam for heating purposes, in lieu of other forms of generators, imperfect as these have heretofore been, naturally calls the attention of inventors to methods of improvement, and stimulates ingenuity to the end of obtaining better ventilation, freedom from obstruction through condensed water in the pipes and other faults, despite which the various steam systems possess so many and varied advantages that, as I have said above, their popularity is ever on the increase. One of the most serious faults which appertain to the use of steam is the want of uniformity in the amount of heat generated in proportion to the needs of the case. In other words, up to the present time there has been no means of satisfactorily regulating the different degrees of heat required by different parties supplied from the same steam source.

An office, usually opened at a certain hour in the morning, if the occupant is delayed one or two mornings in a week for an hour, is uncomfortably warm, and must be ventilated before settling down to work; and ten to one, in spring and autumn weather especially, severe colds are the results of these sudden fluctuations. Uniform temperature is what is required and this the present system guarantees.

The peculiar application of electrical power is such that only a minimum battery current is required to perform maximum work—the largest valve being as readily controlled as the smallest—this force being used, not directly upon the steam valve, but upon a compressed air valve, which, in its turn, governs the movements of the steam. A small storage tank for compressed air, requiring to fill it only one or two minutes per day, or, when water power is available, this is substituted, from which one-eighth gas-pipes lead to the valves—this is the simple addition, or new departure, perhaps, which guarantees the success of the system.

To more clearly explain the working parts, we will refer to the cuts. Fig. 2 is a sectional view of the diaphragm valve, shown complete in Fig. 1.

A (Fig. 2) is the valve body: *B* the valve disc; *H* is a saucer-shaped piece, fastened to the upper end of the stem; *D*, a valve spring; *b* presses forward on the saucer *H*, holding the valve open. Above *H* the umbrella-shaped piece *J* is held by standards *a a*. Underneath *J*, and firmly attached to its edges, making an air-tight joint, is the flexible cloth and rubber diaphragm *K*. The hollow pipe *M* leads through the hole—not lettered—a little to the right of the dotted line *K*, into the chamber formed by the metal piece *J* and the diaphragm *K*. Now, admitting air under pressure through this opening *M*, will, of course, close the valve by forcing it downward, while relieving this pressure, by allowing the air to escape, will permit the spring to open the valve *B*.

A peculiar but correct philosophical principle in this connection deserves thorough comprehension by the reader. The amount of steam pressure which may be thus governed is dependent upon the size of the diaphragm used and the initial pressure in the air chamber.

Suppose, to illustrate, that sixty pounds of steam are carried, and that *B* is an inch valve. In this case the area of *B* is .78 of an inch, and the steam pressure upon it 47 pounds; the area of the diaphragm *K*, as usually made for that size of valve, is 9 square inches. Now, if our air pressure is ten pounds to the square inch, the valve *B* will

FIG. 1.—DIAPHRAGM VALVE.

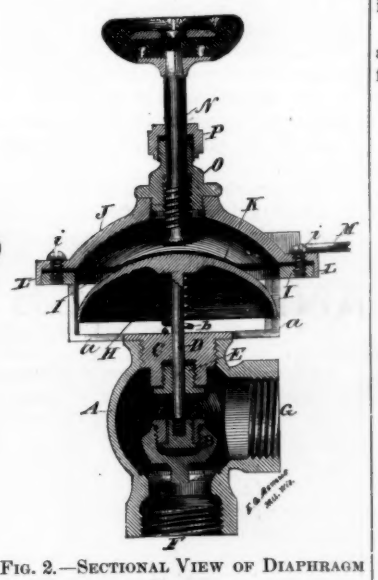

FIG. 2.—SECTIONAL VIEW OF DIAPHRAGM VALVE

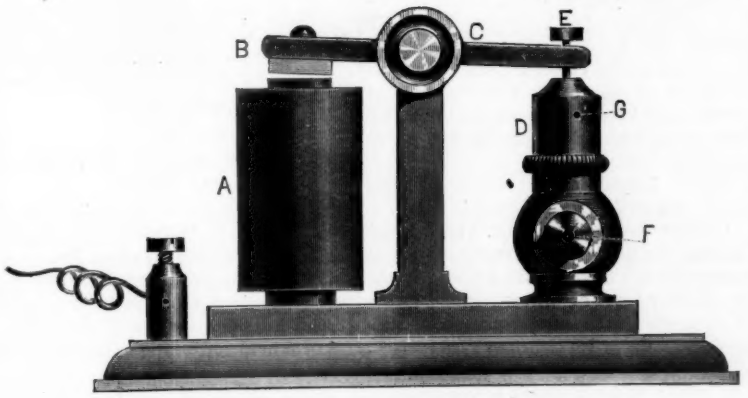

FIG. 3.—SIDE ELEVATION OF ELECTRO-PNEUMATIC VALVE.

be seated with a force of 90 pounds—an excess of 43 pounds over the steam pressure. Suppose we were to allow 10 pounds as a sufficient excess of air pressure, it will be seen that a 10-pound air pressure will operate the valve *B* against 100 pounds of steam, and by an increase of pressure and area of diaphragm any steam pressure may be controlled. In ordinary steam-heating apparatus, where, say, 10 pounds pressure is carried, 1½ pounds of air pressure operates the valve perfectly.

The pipe *M* leads to the electro-pneumatic valve, and is attached to the nipple *F*, Fig. 3, whence, through a short brass pipe connection, communication is established, through an ⅛-inch main, with the compressed air reservoir, usually in convenient proximity to the boiler, and easy of access to the engineer or other party in charge. Other connections are established with this main pipe at other points like *M*, Fig. 2, throughout the building.

Fig. 3 shows the electro-magnet, the armature governing the piston valve. Above *F*, at *G*, is the outlet port of the diaphragm, whence the air issues when the diaphragm valve opens. This may operate in either a vertical or horizontal position, or at any intermediate angle between these two.

Fig. 4 is an ornamental thermostat, having the appearance of an ordinary thermometer. The electric wires are attached to the binding screws at the bottom of the thermometer, whence connections lead to the thermostat proper at the back of the instrument, formed of two sensitive spring plates, which close a contact or key in the circuit when the requisite degree of heat is shown on the thermometer. Between the binding posts above referred to is an adjusting screw, which determines the action of this thermostat key.

The customary regulation mark of this thermostat is 70° F., but it can, of course, be regulated to any desired temperature; and for living rooms or sleeping apartments, two of these—arranged for different temperatures, day and night—are so connected by a simple switch as to give the desired result, by using one or the other as required.

The battery used is of the gravity form, which is effective, constant, and open to few objections. The amount of electrical energy required is so small, the magnet has so little to do, that the number of these and their maintenance cuts but a very small figure in the establishment and continuance of the plant. Should an open-circuit battery like the Leclanche form be preferred, nothing is easier than to reverse the key connection on the thermometer, so that this will be actuated in reverse to the described arrangement.

The invention, slightly modified, is applicable to the hot water heating apparatus used for conservatories and the like. In such

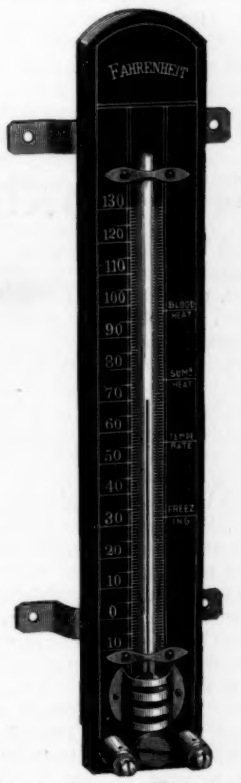

FIG. 4.—JOHNSON THERMOSTAT.

cases, several rooms may be kept at such different temperatures as may be required, say, 50°, 70°, 90°, or 100°.

Fig. 6 shows the arrangement when applied to hot-air furnaces. The thermostat being set for 70°, for instance—the room temperature being below that point—the valve, as shown in the cut, allows the hot air to rise through the register and shuts off the cold-air draft. As soon as the thermometer shows 70°, the valve *A* swings upward against *B*, at the same time closing the hot and opening the cold-air flue, thus maintaining the current of ventilation. In school buildings this arrangement is peculiarly effective, the whole being so arranged as to be outside the interference of janitor, teacher, or pupil, the registers being beyond their reach. Fig. 10 shows a form of butterfly valve, which may be as readily controlled as any of the preceding combinations.

The electrical circuit and the mode of operation requires but little explanation. Start-

ing from the battery, the wire is carried to one of the binding posts of the magnet, Fig. 3, from the opposite post to one side of the thermostat, and from the other side of this to battery. The key in this circuit is in the thermostat. When the desired temperature is reached, this key closes by the expansion of the metal springs, current is sent to line through the magnet *A*, Fig. 3, the armature is drawn down, the valve *F* is opened, air pressure is permitted on the diaphragm valve, Fig. 2, and the supply of hot air is shut off. When the temperature falls below the required point, the circuit is broken, the escape *G*, Fig. 3, is opened, *F* is closed, and the pressure on the steam inlet valve of Fig. 2 is opened, permitting of an influx of fresh steam.

Other applications besides the above are made. For instance, Fig. 5 shows a damper controller for furnaces. Pumps, bathing establishments, dry kilns, ventilators for large buildings, theaters, churches, etc., in connection with heat regulators, and an almost infinite variety of other applications present themselves; but as this article is only an illustration of an application of electricity to the needs of everyday life, a sufficiently varied list of examples is given for the purpose.

The inventor, Prof. W. S. Johnson, is a resident of Milwaukee, Wisconsin, erstwhile one of the faculty of the State Normal School at Whitewater, in that State.

On the Consumption of Zinc in Oxide of Copper Batteries.

By F. De Lalande and G. Chaperon.

The consumption of zinc in an electric battery is one of the most important elements of the outlay which the current involves; the absence of internal work with an open circuit, consuming materials uselessly, is, therefore, an essential condition for a permanent battery intended to act for any length of time.

The oxide of copper battery, which we have previously described in this journal, is one of those which possess this important property. Local actions are suppressed when the circuit is open, and materials are consumed only in proportion to the work done. This fact, established by a tolerably long experience, and affirmed, in consequence of precise experiments by various distinguished observers, may seem in contradiction with the experiments, the results of which have been published by Dr. Van der Ven, if these measures must definitely receive the interpretation which is ascribed to them by the eminent physicist of Harlem.

Without in the least contesting these measurements, let us examine as briefly as possible the circumstances under which they have been made, and which, unfortunately, have not been defined in a sufficient manner.

Dr. Van der Ven cites at first a preliminary experiment in which a plate of zinc, exposed for seven days to the action of a solution of potassa at 30 per cent., has lost a notable part of its weight; but he does not say if the solution of the zinc was effected with or without the evolution of hydrogen—two cases may have occurred.

1. If the amalgamated zinc has been attacked with an escape of hydrogen, this is certainly due to a very simple reason—the bad quality of the metal. Our censor does not seem to have experimented with zincs of different qualities, which would have been very useful. From the fact that a special sample of zinc has been attacked, we cannot infer in a general manner that zinc is dissolved by potassa. Every one knows, in fact, that the quality of zinc intended for batteries for long-continued action should be carefully examined. Amalgamation does not protect them absolutely against local action with an open circuit. The presence of small quantities of lead, arsenic, or other impurities, plays a considerable part. We have met with samples of zinc which were continuously attacked, however carefully amalgamated; others were more or less attacked, and the action did not go on to complete destruction. Most of the sheet zincs of commerce, especially those which are not very thick, perfectly resist the action of alkalies.

2. The attack of the zinc may have been equally produced, without an escape of hydrogen, under especial conditions, as might have been foreseen. The oxygen necessary for the oxidation of the zinc may have been borrowed from the air, instead of coming from the decomposition of the water. We have pointed out this action; a plate of zinc plunged in an alkaline solution is oxidized and dissolved about the level of the liquid, which may even cut the plate in two. This phenomenon is produced more or less decidedly in all batteries. We have indicated the means of suppressing this grave inconvenience by suspending the zinc at a sufficient depth from the surface by means of a plate of amalgamated brass. We have even taken care to cover the surface with heavy petroleum. If the zinc plates studied by Dr. Van der Ven were covered only with a shallow stratum of liquid, this dissolving action may have extended over their entire surface, and suffices to explain the results which he has obtained.

The one or the other of these causes, or both together, may explain the abnormal consumption of zinc observed by Dr. Van der Ven in the first two series of experiments which he quotes, supposing that no false contact had taken place. We remark, nevertheless, that the useless consumption of metal does not appear to follow any admissible law as regards time. It is 0.4 grm. per hour for a yield of 0.075 amperes, 1 5 grm. per hour for the yield of 0.37 amperes, and becomes null for a yield of 0.43 amperes. This appears very singular; for a difference of scarcely one seventh in the yield (from 0.37 to 0.43 ampere) the consumption of zinc, which was theoretical in the one case, becomes in the other three times what theory demands.

"Our experiments," says Dr. Van der Ven, "indicate the lower limit of current intensity, a limit which in an element of any dimensions whatever, but filled with an alkaline solution of 30 per cent. cannot be reached without the production of electricity being carried on in a more and more costly manner."

An immediate consequence of this manner of interpreting the results would be that by decomposing an element of any dimensions whatever, giving a yield of 0.43 ampere into six small elements and the external conductor itself into six equal wires, we should obtain a system where the same total electric circulation would correspond to an outlay five-fold the original outlay. In fact, each elementary couple would then yield 0.071 ampere—very close upon the yield of 0.075, which, according to Dr. Van der Ven, gives rise to a consumption five-fold the electro-chemical equivalent of the current. The simple juxtaposition of the active surfaces and the wires would have thus an influence upon the phenomena which it is equally difficult to admit and to explain.

Messrs. Lalande and Chaperon, in a communication to *La Lumiere Electrique*, say:

"We are convinced that Dr. Van der Ven will find, on continuing his experiments, that necessary phenomena of the kinds indicated are the only cause of the apparent anomalies in the relation between the quantity of electricity and the active consumption of metal. We thank him, moreover, for the candor and the loyalty to truth which he has shown in recognizing the justice of our observations on his former research."

No Further Waste of Lightning.

A tall stranger, with a queer loooking apparatus under his arm, called upon the examiner of patents recently, and explained an invention of his for controlling atmospheric electricity. He claims that by intercepting a flash of lightning at the ground connection of the ordinary lightning arrester, he can control the dazzling fluid, or "tame it," to use his expression. The apparatus in which he proposes to capture "Jove's thunderbolts" is a thoroughly insulated storage battery containing an unbroken coil circuit of wire, insulated with a composition of volcanic lava. The lava insulator, he says, will resist the full force of a flash of lightning powerful enough to demolish a three-story building. The appearance of this odd lightning tamer has created amusement in scientific circles, but it is a fact that its inventor has found many persons who believe in his invention. He refers to Benjamin Franklin's experiment with a kite, and is anxiously awaiting the arrival of one of the tropical thunderstorms which annually visit this city to make a test of this battery. If he can obtain permission from the authorities, he will attach his instrument to the ground connection of the lightning arrester at the base of the Washington monument. The extreme point of this arrester is over 500 feet above the earth, and during a storm the peak penetrates and extends far above the lowering clouds. Should the lightning tamer succeed in capturing an electric blaze, he announces his intention of placing it on free exhibition as one of the wonders of modern science, and a wonder it certainly would be.

Another Electric Current Regulator.

An automatic regulator for electric circuits has been worked out in England, recently, by two electrical engineers. An electric magnet is employed either in circuit with the supply wire, or in derivation as convenient. The armature, whose motion towards the poles is opposed by an adjustable spring, weight, or other equivalent, carries a carbon contact, which, on the arrival of an excess E. M. F., sufficient to overcome the mechanical resistance opposed to the pull of the electro magnet, makes more or less firm contact with another carbon point in connection with a variable resistance, forming an additional path for the current. By composing the variable resistance of one or more incandescent lamps, the regulation of the bye-path is said to be very perfect. A slight increase of E. M. F. produces light contact between the carbons, while, only a small current passing through the lamp, its resistance is only very slightly lowered. As the excess E. M. F. increases, the resistance offered by both the carbon contacts and the filament of the lamp decrease until the limit is reached, for which the apparatus is arranged, and *vice versa*. On the removal of the strain the bye path closes. It will be seen that this regulator forms an excellent substitute for forcible cut-outs, relieving the strain upon the lamps without putting them out. It is claimed that in a very crude form it maintained the current at uniform strength in a circuit of two arc lamps, when one lamp was short circuited. This regulator is said to be of special utility in the case of installations, where gas engines are used to compensate for the increased E. M. F. at each explosion, but even in the case of steam engines, it will render important services.

Electric Light on Board the S.S. Umbria and Etruria.

The London *Electrical Review* says that Messrs. J. D. F. Andrews & Co., Woodside Electric Works, Glasgow, have just completed, on board the S.S. Etruria, the second of two installations which in their proportions surpass anything that has hitherto been attempted in the application of electric light to steamships.

In the Umbria and Etruria the installations consist of about 850 lights each; and we append a description of one of the installations, which will, we have no doubt, be interesting to our readers. (The description applies to both installations.)

The space allotted to the electric machinery is unusually large, measuring 32 ft. by 14 ft., and is situated on the lower deck midships forward of the engine room. Here are placed four Brotherhood engines, two abreast, back to back, three having cylinders 8 in. diameter by 6 in. stroke, and the other 6 in. diameter by 4½ in. stroke. The small engine drives a Siemens 200-light machine, and the other three a 350-light dynamo each. Swan glow lamps are used, and of these ninety are distributed in the engine room, stoke-holes, etc. The wires conveying the current to these lamps are covered with india rubber and a special composition for resisting sea water, and they are sheathed over all with iron wire, as a substitute for the tube generally used in engine rooms and such places.

The joints between the branch and main wires are protected by a small T-shaped joint-box. Each lamp in the engine room, as also in every other part of the ship, is fitted with a very simple switch. It consists of a screw, severing connection to the lamp from the ship, which is used as a return. A fusible connection is also attached to each lamp. The engine room lights are divided into two circuits, each with a separate switch; and each stoke hole is also on a separate circuit.

The dynamos are connected to the main switch-board on the bulk-head close to the engines. To this switch-board also are brought the six main circuits that supply the ship.

The switch-board consists of an iron box about 4 in. deep, with its opening against the bulk-head. In the face of the box are four rows of six holes, each 2 in. in diameter, radiating from the center, and the box is half filled with a board of teakwood with corresponding holes. In each of the holes in the teakwood are fixed copper springs, one on each side of the hole; one spring of each hole of a row is connected to a brass strip in communication with one of the machines, the other spring being joined to a circuit of lights in the ship. A brass knob with a stem, and an insulated ring at the end of the stem is pushed into one of these holes when the machine is to be connected with one of the circuits. The corresponding holes in each circle are joined together, so that by removing the plug from the hole in one position of the row, and placing it in the corresponding hole in another, the circuit will be joined to another machine. The circuits are numbered, starting from the stern of the ship, the first circuit supplying the night system, in which are about 200 lights, including those in the engine room and stoke-holes. No. 2 circuit lights the after portion of the ship. No. 3 lights midships. Nos. 4 and 5 supply the saloon, ladies' saloon, music room, etc. No. 6 supplies all lights forward of the saloon. Each of these main leads is carried to a group of switches at the junction of the main branch leads, where there is also a fusible connection. Each of these switches controls a group of about thirty lights, and they are placed in boxes recessed in any convenient places—in passages, generally, and at the foot of stairs. The switches are constructed of a brass box, and on a similar arrangement to that described as being used as the main switch-board, except that the plug cannot be entirely withdrawn. In appearance this switch resembles the ordinary steam wheel valve. The main branch fusible connection which protects the wires is a small circular block of wood with a groove across it, in which is laid a piece of lead wire, No. 16 B.W.G., connected at each end to a screw which projects at diametrically opposite sides of the block. The switch and fusible wire are connected together by a loop of wire. The small branch wires lead to the lamps direct, without the intervention of other fusible connections; but in the back-block of the lamps there is a piece of No. 20 lead wire which protects the lamps, and also, in the event of a defect, shows in which lamp it is.

In addition to the switch inside the room or in the lamp, there is also a switch of the same kind placed in the return wire in the passage, one for each state-room. This firm has been the first to introduce switches in the return wire.

The holder is also of new design, although the same as used by this company in the installation on the Ems, and various other installations. It consists of four spring prongs formed from a brass tube; two of these grip the neck of the lamp, which is made of plaster of Paris, knob-shaped, to suit them. The other two have saucer-shaped ends, and press on brass contacts held in the plaster. As will be understood, one of the prongs is insulated from the rest by a small piece of wood forming the body of the holder, the insulated prong being attached to a pin passing through the center of the wood. The

holder is screwed on to the nozzle or nipple of the electric bracket, and in screwing it, the pin holding the insulated prong meets with the wire projected from the end of the nipple, thus making contact with the central wire fitting.

Altogether 103 lights are used in the lighting of the main dining saloon, 84 of which are suspended over the tables in 3-light electroliers, hanging about 2 feet 6 inches from the ceiling. The remainder of the lamps are in small brackets and pendants, so as to give light over the side seats. The lighting of the saloon is very effective.

Above the saloon is the music room, having 17 lights round the walls and over the piano and organ. The smoking room has also 17 lamps. The remainder of the lamps are distributed about the ship, 172 being in the state-rooms. All the fittings are silver-plated, with the exception of those in the galleys, seamen's quarters and engine room.

On the upper deck, just outside the engine room, is a cast-iron box containing two switches and connecting terminals for the Andrews arc lamps. These lamps are of the same design and construction as those adapted to a mast-head light on board the North German Lloyd Company's S.S. Ems and Eider.

The lamp is of great simplicity, and is well suited for the use of those not well conversant with electrical matters. In this case the lamp is arranged with double carbons.

Western Union—Its Dividend-Paying Powers and Legal Vulnerability.

The Western Union Telegraph Company has just paid its quarterly dividend of 1½ per cent., which, on its $80,000,000 outstanding stock, amounts to $1,200,000. Whether the next quarterly dividend will be 1½ per cent. or 1 per cent. is at least doubtful. In December, 1880, Jay Gould considered the Western Union stock as dear at $40 per share, and then the stock outstanding was but $41,000,000, including $5,978,125 distributed to the stockholders in 1879 as a stock dividend. The last dividend paid by the Western Union Company for 1880, just before the remarkable consolidation with the American Union and Atlantic and Pacific Telegraph companies in January, 1881, we are told, exhausted the entire alleged surplus. That was a quarterly dividend of 1½ per cent. on $41,000,000, and it is stated that Mr. Gould at that time said peculiar book-keeping had to be resorted to by the Western Union to make the ends meet.

In January, 1881, Mr. Gould, with the co-operation of William H. Vanderbilt and some others, succeeded not only in plastering the American Union on the Western Union at $15,000,000, but also the Atlantic and Pacific at $8,400,000—a total of nearly $24,000,000 for property estimated at the time to be not worth over one-fourth the amount. Neither of the companies named was legitimately paying operating expenses. The consolidation once arranged, Mr. Gould, whose smartness never has been questioned, saw new possibilities in the Western Union. The telegraph business of the country was in its grasp, and he suddenly discovered that the company, which two months before was not earning 6 per cent on $41,000,000, could earn 6 per cent. on $80,000,000 during the first quarter under the new regime, and have a surplus besides.

At the time (January, 1881,) the Western Union had a large amount of stocks of various telegraph companies which it called a surplus, and which was made to justify a part of the increase in its own stock. Issuing Western Union stock to represent these stocks and distributing it as a stock dividend to Western Union holders, it is held, ought to have practically canceled these stocks in the treasury. No sooner did Mr. Gould get into control, however, than his passion for manufacturing chromos developed, and in the case of some of these outside companies he doubled the stock and sold the increase, and with the proceeds helped to pay unearned dividends.

He blinded the public by keeping as many shares in the list of assets as before, but failed to explain that they represented only half the value.

Meantime, to justify continuation of dividends, as history records, a new scheme was devised, and in 1882 it was discovered that the true plan was to divide all the net earnings among stockholders and charge all construction to new capital account. The colored gentleman in this wood-pile, when hauled out of his hiding place, indicated that whatever was necessary to be taken out of

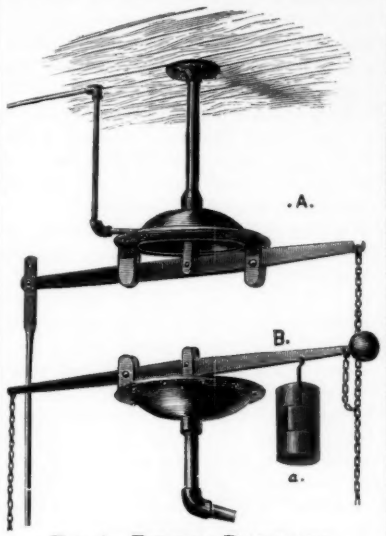

FIG. 4.—ELECTRIC DIAPHRAGM.

expenses, to allow sufficient nominal net to show a dividend, could be charged to construction account, and that irrespective of whether it was new work or merely repairs. This fact, it is charged, has allowed the creation of a construction account of an unknown amount, but believed to exceed $4,000,000.

The dividend at one time was raised to 7 per cent. per annum, but was subsequently reduced to 6 per cent. per annum. When the last dividend was declared, it was not on

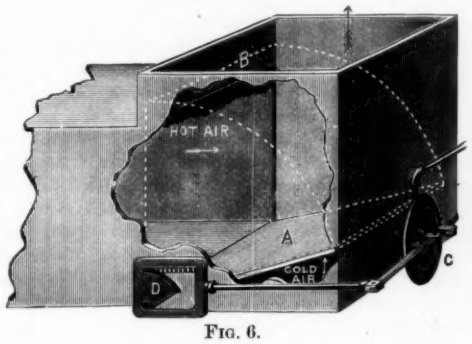

FIG. 6.

net earnings known, but on "almost complete returns for January," "partial returns for February," and "estimated returns for March." This left a margin over the dividend of some $6,500. The Baltimore and Ohio and the other opposition telegraph companies are bleeding the Western Union at all the principal cities east of the Missouri River, and the rates are the lowest that ever prevailed in this country; hence the impossibility of long keeping up the scheme of manufacturing earnings. Another peril that overhangs the Western Union is the danger of reopening the question of consolidation and increase of stock to $80,000,000, which was supposed to have been decided by the Court of Appeals at Albany in the Hatch and Williams cases.

When these cases were stopped, it was believed that there was no way of getting the matter up for review, nor anybody who as a stockholder could file a fresh bill, because Gould had taken the precaution to have all the old stock certificates canceled and exchanged for the certificates issued under the $80,000,000 capitalization. It is now claimed, however, that a plan has been discovered by which the whole question can be reopened and the plaintiff have a better standing in court than either Rufus Hatch or William S. Williams had. It is urged that the findings of fact by Judge Truax, upon which the Court of Appeals acted, were wrong and in contravention to testimony taken. New facts, it is stated, can be adduced in a new suit, and, if the case is brought in the United States court, a question could be decided that might be too delicate for the Court of Appeals of this State to decide upon.

Drawing Wire From Fluid Steel.

Wires and bars are now produced direct from fluid steel, by pressing it out through dies in a manner similar to the production of lead pipes from lead. An iron vessel, lined with refractory material, is provided with a manhole and a cover at the top, and securely closed. At the bottom opposite the manhole there is a cast iron outlet tube, through which passes a steel tube with water circulating round it exactly like a "tuyere," by which the steel pipe or die can be cooled. The inner end of the steel tube is lined with fire-clay, where the very hot fluid steel meets it. The tube is plugged up by a steel stopper, and the liquid steel is filled into the vessel with liquid carbon dioxide above it. The stopper being withdrawn, the liquid steel is forced out by pressure of the carbon dioxide in a red-hot rod or wire, which goes from the vessel into the rolling mill while still hot, and is there finished off. We may also add that steel is now produced direct from the ore by a new process of a French engineer. The ore in a powdered condition is submitted to the action of carbonic oxide gas at a high temperature in a cupola or blast furnace, where it is reduced by the incandescent gas to pure iron or steel.

Armorial Bearings.

Virginia and Massachusetts, it is asserted, are foremost among the States of this Union for the preservation of family genealogies and coats of arms. It is a harmless hobby, and hundreds of families in the old Commonwealth and in the old Dominion take pleasure in tracing their descent to the Old World, and using old silverware bearing the crests of the armorial devices of their Anglo-Saxon ancestors.

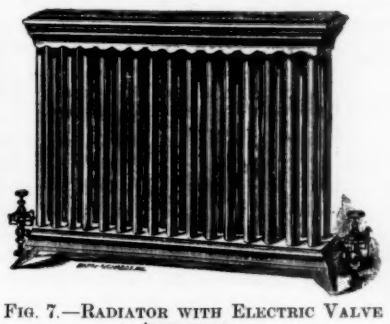

FIG. 7.—RADIATOR WITH ELECTRIC VALVE ATTACHED.

But there is another class of citizens, proud of the possession of newly-acquired wealth, who consider that it is a very important point for such persons as can afford to keep a carriage, to have a coat of arms, to emblazon it withal. It does not so much matter what the coat of arms is, as that they should possess one of some kind. There are all sorts of queer devices hit upon by our new-fangled aristocracy, and they are mightily jealous of the antiquity and respectability of their armorial bearings. The new comers within the charmed and golden circle are watched and scrutinized as narrowly as if they were suspected of a tendency to steal somebody else's gold spoons, or "appropriate" their neighbors' private coat of arms.

Mr. Shoddy, who got rich yesterday, quite looks down upon Mr. Petroleum, who only got rich to-day; and both of them will view with disdain the airs and social contortions of Mr. Cottonbags, who will get rich the day after to-morrow. As it is said there are no enmities so bitter as those of intimates, no quarrels so fierce as those of relations, so there is no jealousy so exclusive as that of your genuine parvenu, who has made a fortune without possessing the sense or the education to teach him how to use it. His first instinct is to ape the manners and style of the social aristocracy to which he desires admission; his second, to frown down all the later comers to that high eminence.

A genuine man, who hews his way to wealth by his own industry and enterprise, should have no difficulty in creating his own coat-of-arms, quite as honorable and far more appropriate than any he could borrow from the Herald's College. Thus, a carpenter who has risen to wealth and high position might be proud to have as his armorial device a plane or a saw; a mason might rejoice in a trowel; a blacksmith a forge, and so on. The winner of wealth by lucky speculations or less honorable employment would find more difficulty in selecting equally appropriate and significant emblems. We remember the neat and classical joke perpetrated by Curran, when a wealthy tobacconist was about to set up his carriage, and asked the eminent Irish barrister for a motto. "Motto, my dear sir, certainly; what could be more appropriate than *quid rides?*"

The misfortune of the parvenu aristocracy everywhere is that their ridiculous vanity will not suffer them to adopt anything significant of their plebian origin. When will men learn that true nobility consists only in character, that no aristocracy is worthy of respect but the aristocracy of worth, and that, as the poet sings,

> Howe'er it be, it seems to me,
> 'Tis only noble to be good,
> Kind hearts are more than coronets,
> And simple faith that Norman blood.

*** A stormy meeting of the directors of Taylor Locophone Company occurred last week. Manager Alonzo Hall tendered his resignation, which was not accepted. In forming the company it was understood that Frank Taylor, the inventor, should confine the sale of his patent to the United States. Lately he has been negotiating with English agents to introduce the locophone in Great Britain to be used upon locomotives running over the English railroads. Manager Hall, who is a heavy stockholder objected to this move of Mr. Taylor, and in consequence determined to withdraw from the company. The meeting adjourned for one week, and in the interval Mr. Taylor will endeavor to cancel his foreign contracts by cable. It is claimed of course that the Edison railroad telegraph system does not conflict with the locophone. The Edison system is a message sent by telegraph and received by telephone, the Morse cipher being of a peculiar musical sound. Taylor's locophone is the regular telephone intensified.

*** The receipts of the Tropical American Telephone Company for 1884 were as follows:

Profits on sales of instruments and supplies, January 1, 1884, to July 1, 1884	$7,783.30
Do , July 1, 1884, to January 1, 1885	7,239.16
	$15,022.46
Received for sale of Barbadoes	12,000.00
Gross	$27,022.46
Expenses, first six months	$4,694.54
" second six months	4,047.18
Total months	8,741,72
Net receipts, 1884,	$18,280.74

The company's surplus, March 13, 1885, was $29,246,78.

The net output of telephones by the Bell Co. for the month ending April 20 was 1691, as against 60 during the previous month, a loss of 594 in February, and 298 in January.

*** The case of the American Bell Telephone Company against the Clay Commercial Telephone Company came up for argument in final hearing in the U. S. circuit court in Philadelphia last Friday before Judges McKennan and Butler. The defendants were not ready to go on, their record being printed, and the final argument went over till June 1. The court, however, issued an order restraining the defendants from infringing until the final argument. This will operate to close the Clay Telephone Exchange of Philadelphia at once.

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We invite correspondence from Electricians, Inventors and the Telegraph and Telephone fraternity and those engaged in Electric Lighting on matters pertaining to electrical and scientific subjects, and all facts of special interest in connection therewith.

We extend to manufacturers of electrical apparatus an invitation to send to this office any and all facts concerning their business which will be of interest to the public. We make no charge for publishing news.

Subscribers can at any time have the mailing address of their paper changed by sending both old and new address.

Mr. J. Viennot, 150 South ourth Street, Philadelphia, is our accredited representative for Pennsylvania.

Mr. Charles W. Price, 103 Adams Street, Room 9, Chicago, Ill., is our representative for the West.

Messrs. Wm. Dawson & Sons, 121 Cannon Street, London, England, are our representatives for Great Britain.

NEW YORK, MAY 2, 1885

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Those wide-awake railroad officials who desire complete and reliable information relating to electric motors, communicating between moving trains, electric head-lights, etc., etc., will find it in the ELECTRICAL REVIEW, from week to week. Stick a brake-pin here, Mr. Railroader.

Frank W. Harrington, superintendent of the factory of the Western Electric Co., Boston, succeeds Col. Geo. L. Beetle as general Eastern traveling agent, with headquarters in New York. No better man to wear the mantle resigned by Col. Beetle could have been called. Mr. Harrington is familiar with the field, is energetic and popular, and will do splendid work for his company.

It is a fact not generally known that more brass is used in the manufacture of oil lamps than in any other one article. The brand worn by the commercial tourist, it may be well to state, is not included in the comparison.

Mr. J. F. Morrison, president of the National Electric Light Association, was in the city this week, and while here met Mr. Hochhausen, of the Excelsior Electric Company, resident member of the Executive Committee. Another meeting of the Association, to be held in July next, was discussed, and will be called as soon as the views as to time and place of the other members of the committee are obtained.

Now and then the Morse alphabet explodes on an innocent man in a way that makes him lose sleep for a week. A Boston gentleman, who owns some fine horses in this city, telegraphed over a few days ago as follows: "Will be in at three o'clock. Want to drive the mares." The livery-man studied the following until his nerves became weary: "Will be in at three o'clock. *Want a drink of water.*" From some quarters such a thirsty message would not have appeared strange, but from Boston, and from that man in particular, and for "water"—well, the livery-man confessed he was completely puzzled until the sender arrived with the solution. Then another solution was furnished, consisting of "what 'luave" without water.

THE ARC LIGHT SCORES A VICTORY.

Several years ago, when the voltaic arc light first made its appearance in the streets of New York, we said in these columns that, if given a fair trial, the public would refuse to have any other. Year by year the number of these lights have been increased, until now the city authorities have determined to spread them over all the principal thoroughfares. This result was attained in the face of a powerful, and, unless it has changed very much within a few years, a very corrupt gas-lobby. The fact is, the arc light has proved so effective in illuminating the streets that the Board of Aldermen, even had they been inclined to disregard its claims to popular favor, could not have done so, because the advantages of the light were so glaringly apparent.

And right here we would like to remove an erroneous impression which the Superintendent of Gas and Lamps gave—no doubt innocently—when on last Friday he sent to the Board his communication concerning estimates. He said in that communication that the resolution of the Common Council called for 2,003 additional electric arc lights to displace 5,345 gas lamps, an equivalent of about two and a-half gas lamps for each electric light placed. Now, the fact is, the voltaic arc light, instead of taking the place of two or three gas lights, as the superintendent would seem to infer, has been found to diffuse an intensity equal to from eight to twelve gas lamps. The sum asked for by the Common Council was not intended for immediate use, and there is no immediate intention of dousing all the "glims" that these 2,003 arc lights will at some not far distant day replace. This would have been clear enough had not our fellow citizen McCormick been so long in the society of gas-men and gas-meters as to incline toward exaggeration. For as the gas-meter can make figures appear as true which have no foundation in fact, so the ingenuity of McCormick can give a turn to a correct statement that will lead to a mischievous construction.

McCormick says that he cannot see that electric lighting has any advantages over gas, but McCormick forgot to tell us what seems to be a fact, that he is very near sighted, and were we not quite sure of this we would incline to the uncharitable and no doubt altogether erroneous opinion that McCormick has been somewhat economical of the truth.

And so the City of New York is to be lighted throughout with electricity—that is, unless that ingenious body of scientists, the New York Legislature, shall insist that the electric lamps shall only be found, like the treasure of the licorice tree, under ground.

HEATING BY ELECTRICITY.

It is with no little satisfaction that we find electricians taking hold of the problem of domestic heating by electricity with something like earnestness. Something has, as we know, already been accomplished in this line, but for the most part electricians and mechanicians have seemed too much occupied with other and, perhaps it is not too much to say, more important problems to attend to than this matter of heating But it was long ago promised that we should have light, power and heat over the same wire, and now that the first two promises have been fulfilled it seems to be about time practical success was had with the latter.

We are now urged to these remarks by the success in this line recently scored by Mr. Sellon, who, together with Faure and the late Mr. Volckmar, have done so much in improving the electrical accumulator.

Our French contemporary, *Electricite*, describes an electrical stove recently designed and constructed by Mr. Sellon which seems to be far in advance, so far as usefulness is concerned, of anything of the kind our attention has been called to. In this stove apertures are formed in plates of refractory clay and plumbago, and through these the wires are led. These plates are not enclosed but are left exposed so that the air can circulate freely through and through the apertures, where it comes in contact with the red hot wires. Wire bobbins are inserted in the apertures, and each bobbin forms part of the electric circuit, being all connected for quantity. These bobbins are, of course, heated by the passage of the current, and, as said before, serve to heat the air as it passes to and fro over them.

As will readily be seen, this system can be applied in numerous ways and to many purposes. One of these is the application of the principle to the ventilator of a room so that the cold air has the chill taken off before entering. With boxes or tubes filled with acetate of soda, a substance which retains its heat, cars could be effectually warmed by an application of the same principle.

A dwelling chamber, heated in this way, or, rather, kept at a normal temperature, for electricity does not take the vital principle out of the atmosphere, would be a more fitting place for human habitation than if heated by a furnace or directly by a coal or wood fire. Who has not felt a sense of suffocation in the modern dwelling house? Gas does enough to vitiate the atmosphere without the aid of other products of coal combustion, and we should congratulate ourselves that the time is not far distant when every dwelling will be heated, as well as lighted, by the unseen but powerful current that continually passes over a fine wire.

IN RE TELEPHONES.

Just now the legislatures of several of the States are occupying themselves with telephonic matters. Here in New York a bill has been introduced to limit the charge for telephones to three dollars per month in all cities of "*over* 75,000 inhabitants." Upon what basis the originator of this remarkable measure founds it does not appear. It long ago became apparent to everybody that the larger a city the larger the number of subscribers, and consequently the greater the amount of service given to each individual subscriber. This is an axiom in the telephone business which no one who has given the subject a moment's serious thought questions for a moment. If it had been proposed to limit the price per subscriber to three dollars per month in all cities having *less* than 75,000 inhabitants, there would at least have been an appearance of sense in it, but as drawn the proposed measure is simply an absurdity.

But why, and upon what ground, it may reasonably be asked, should legislatures interfere to regulate the price of telephoning at all? They do not concern themselves to regulate the charge of telegraphing nor for expressing, and why should they select this one means of communication and seek to regulate the price by law? If the companies place their rates too high, the people will not use their instruments, and the companies will be the losers. It may fairly be assumed that, in fixing these rates, the companies will take into consideration what the service is worth to their subscribers, and what the latter are willing and can afford to pay, just as those who sell sewing machines, or any other patented article, regulate their prices according to the market.

In Massachusetts a good deal of attention has been given to telephonic matters by the Legislature this winter. There is a bill pending to regulate prices. It has been the subject of several public hearings, and there has been much argument on both sides. The result is still doubtful. A bill looking to the heavier taxation of the New England Telegraph and Telephone Company is also under consideration, and seems likely to pass at the present writing. Then, again, the request of the American Bell Telephone Company to have its capital stock increased to $30,000,000 is still before the Legislature, having also been the subject of a number of hearings. Thus the legislators of the Bay State have had telephonic questions very generally brought to their attention, and ought, if they have taken advantage of the opportunities to inform themselves which have been offered them, to be by this time tolerably well prepared to vote understandingly at least. But the trouble is that all these bills inimical to the telephone interest come from parties who have an axe to grind or a grudge to pay off, and do not, in a single case, grow out of any desire for that for which legislators are supposed most particularly and specially to care—the public good. There are those who, for some occult reason, lose no opportunity to hamper and embarrass those who are concerned in the telephone business, and it is they who are now seeking to accomplish through the instrumentality of the law what they have failed to accomplish otherwise.

It is a little singular that, at the very time when the public is urging the telephone companies to put their wires underground, thereby entailing very heavy expense upon them for extensive construction, which, at the best, can only be called experimental, the legislatures of several of the States are listening to propositions to cripple them financially, by curtailing their revenues through laws such as are not thought of in connection with any other industry.

A STRONG ELECTRICAL ORGANIZATION.

Lytle & Co. is the name of a new firm just organized here for the purpose of dealing in all kinds of electrical apparatus used in the telephone, telegraph and electric light fields, and also for introducing throughout the country a new and complete system of electric time. The company will at once arrange for furnishing all business houses in the cities within their territory with time-pieces that can be relied on for absolute accuracy and this at a very small expense. The active management of the company will be in the hands of Messrs. H. B. Lytle, Geo. L. Beetle and Frank B. Knight—a strong and responsible union, possessing the elements of success in the highest degree. All are familiar with the electrical field, and accustomed to handle large interests of which the general public is a patron. Colonel Beetle, whose resignation has been tendered the Western Electric Company, to take effect May 10th, combines an exceptional personal popularity with sound business judgment that made him a tower of strength for the company he has represented for five years past. Both he and Mr. Knight will now be closely identified with interests the growth and success of which will be a direct benefit to them. The unfortunate financial difficulties that have overtaken the Palmer Wire Company, and which we hope to see happily arranged, compelled the change in Mr. Knight's relation to them as general agent. His excellent work for them, and for the American Bell Telephone Company, as general agent, has deservedly won him friends in the electrical field to be numbered by the score. Mr. Lytle, late general manager of the Chesapeake and Potomac Telephone Company, and of the Telephone Despatch Company, of Boston, at present president of the Massachusetts Time and Telegraph Company, and of the National Insulator Company, both of

Boston, is one of the best posted men in all that pertains to practical telephone management in this country—a gentleman of means and enterprise, capable of handling large interests with rare tact and discernment. There is no combination with a stronger personal following in the electrical field to-day than Lytle & Co. The organization is fully responsible, in a financial sense, for all that will be undertaken; and its incorporators possess what is more valuable—a personal integrity and business tact that assure them the confidence of the commercial world wherever they are known. The REVIEW wishes them the success that it feels is assured.

The office of Lytle & Company will be at 15 Cortlandt Street, New York City.

GENERAL WESTERN NEWS.

If there is any one special small field in electrical work which has been plowed and harrowed and sown and weeded more effectually and to less purpose than almost any other of the same dimensions, it is the lightning arrester patch. First came the saw tooth plates, such as the telegraph and the telephone companies still use to some extent; then this was varied, in that the saw teeth became points of screws which might be adjusted. Then bobbins of very fine insulated wire on a metal cylinder, connected to ground; and between each change of these in form or other characteristics, some fellow stuck in his nose with a device having for its fundamental the charging of an electro-magnet by the current which, unguarded against, was liable to do mischief. From present appearances it will take at least one more generation of telephoners and telegraphers to teach these electro-magnet fellows that a charge of lightning capable of burning out relays, call drops, telephones and like instruments, is like a through telegraph wire—too hot to do way business.

The single coil of fine wire around a cylinder of polished metal attached to the ground, in use by the Western Union—I think the invention of C. H. Summers—is good for currents of heating proclivities, for the high resistance offered to the passage of the current burns off the wire and either leaves it open or welds it to the ground connection.

Mr. C. H. Wilson, of the Central Union Telephone Company, has lately given this matter some attention, and the result seems to be all that can be desired in that direction. A block of wood or other insulation has a bolt at one end to which the line is brought, and secured by washers and jam nut. This bolt projects downward and through the block. In the center of the block a loose pin with a head on the upper surface of the block formed like a section of T-rail, extends a short distance below the block, where it comes in contact with a ground plate spring, so arranged as when the pin is pressed downward this spring is held away from the lower extremity of the first bolt, which is connected to the line wire. On the opposite end of the block, a screw with washers and jam nut enters but does not pass through the block. The face of the block then presents to view two binding screws and the T-rail bolt head. On this last a piece of very thin mica is placed, long enough to project over the sides of the web to allow of a rubber being placed round this to hold it in place. The wire is brought to one of the binding screws, and after being securely fastened is drawn tight over the mica, and thence to the second binding post. This strain has the effect of forcing the T-headed bolt downward, the lower end depressing the ground spring from the back of the block, and keeping this away from the lower end of the bolt containing the line binding screw.

Thus it will be seen that the wire is within the thickness of a sheet of mica from the ground, and as long as it remains intact it will be so insulated. At the same time should this wire be burned by a current, the spring beneath will be free to act, and this will rise and make ground contact with the line wire. On the other hand a current of too high tension to effect this result will discharge through the thin mica insulation to ground, before reaching the coils. In this way it is claimed, and this claim is based on experience, both high and low tension currents are provided with means of escape to ground without detriment to either instruments or offices.

And speaking of telephones, the Chicago company is laying a six inch Dorsett pipe through La Salle street from their exchange next the old Board of Trade to the new board building, in which will be placed two systems of wires, three Patterson cable, with two hundred, and a Kerite aggregation of forty wires, 240 in all. As everything on this part of La Salle street is in some way connected with market transactions, or as has been expressed, "by, to, of, or with Board of Trade," there is a general exodus of parties in the direction of the new locality. To retain its hold on the messenger business appertaining to this class, the Chicago Telephone Company will open a new messenger office in the Grand Pacific at once, and thus accommodate transients at the hotel as well as the board people. The Dorsett people are also pipe laying on the same ground, continuing their labors of last season.

The Indiana legislators have taken it into their heads that the telephone people need a little wholesome regulating; and with a sort of a communistic idea of divide-every-Saturday-night-as-long-as-you-have-more-than-we idea, says that hereafter the legal maximum charge for telephone rentals shall be $3 per month, or $36 per year.

It is not unlikely that this law may be declared unconstitutional, and it is quite probable that when the facts of cost, royalties, etc., come to be known, and the curious fact, anomalous as it seems to the public who are not posted, that the expenses of a telephone exchange increase in arithmetical progression, with increased patronage; or, in other words that while this rate of $36 may pay for a small exchange it will not for a larger one, and for one the size of Chicago or New York would throw the company into bankruptcy, were it an isolated holding, the law may be changed to one of some reasonable data. However, as long as the come-and-see-me policy pervades all legislatures and the honest granger has learned to hold his hands behind him—palm up—and repeat his excerpt from the Lord's prayer "give us this day"—companies must toe the mark, or get left. The next session of the Hoosier Solons will probably see the telephone pinch bill repealed.

A wonderful, thoroughly astonishing affair is the sixty-cent electric light, battery, wires, etc., complete, for desk use What the tobacco pipe gas factor is to the two-dollar-and-a-half-a-thousand monopoly works, this is to a hundred light plant. Your correspondent is overwhelmed with contemplation of the astonishing advance in the science of electric lighting, as manifested in this exemplar. Would that he were an artist mechanician, that proper diagrams might illustrate the wonder. A wooden stand two and a half inches high, an incandescent lamp surmounting this of at least $\frac{5}{8}$ diameter, a pill-box full of bi-chromate of potash, two broken carbons and a pair of zincs—the latter intact—all in a badly demoralized pasteboard box, and the whole a present from generous friends. Thanks! What more is necessary?

A gentleman named Franklin once stated that he could make a pudding, one mouthful of which would be all a hungry man would want. He won his wager—the pudding was made of bran and sawdust. One such lamp is sufficient—two would be superfluous. This one is shelved in a museum, as an electric freak, as ornamental and as useful as an empty Stoughton bottle with the bottom out.

Considerable sensation has been indulged in relative to the overtime of operators employed by the Western Union Company here. These parties, feeling aggrieved, have been interviewed, and their case written up by the daily reporters in several instances The grounds of complaint are that the company has cut off considerable of their revenue by discontinuing the extra hours pay roll, and crowding the operatives beyond proper working hours. By way of enforcing what to them seems their just demands, they have set forth their grievances in a petition to Superintendent Tubbs.

On the other hand, Superintendent Tubbs makes this statement. At a time when business became depressed during the latter part of last year, and in nearly every mercantile and manufacturing concern hereabouts retrenchment was encompassed by either cutting down salaries or reducing clerical force, the Western Union, compelled by sound business acumen to reduce expenses in some form, cut off the extra pay roll, which at that time was comparatively a small affair, and retained their full force—subject, of course, to the ordinary fluctuations inseparable from the handling of a large number of employes.

When the European war rocket blazed out on the 9th of the present month, the amount of matter transmitted suddenly rose to a maximum, and, of course, the extra hours as suddenly became a matter of more consequence. This rush is looked upon by the company as only a temporary one. In the meantime, the company claim to be relieving the pressure by increasing the force as fast as is consistent with procuring good, reliable operators.

Should the rush for any cause show prospective permanency, one of three things will be done. Either daily pay will be increased, extra time will be paid for, or additional force be put on to relieve the pressure.

This retiring of the extra pay roll is by no means confined to Chicago, but is in vogue at every principal point in the Central Division, and, while temporarily it may be working some hardship upon the employes, the officers of the company seem to think that, taken in the long run, it has in reality been the means of giving all-winter employment to operators, who, under the old regime, would certainly have been thrown out of employment.

The average time of work under the present ruling is about nine hours—the lowest six and a fraction, the highest over eleven. The force is divided so as to rotate these, and the old rule—first on, first off—is carried out as thoroughly as circumstances will permit.

The sensational talk about a strike is all bosh. It is seldom that the same operators ever strike twice, and it is a pretty well established fact that the last dose of that sort of medicine is all that the employes will hanker after for some time to come.

An unfortunate accident occurred on the 22d instant at the plant of Willoughby, Hill & Co., southeast corner of Madison and Clark streets. A new plant, or rather a change of the former plant of Brush lights, was being installed, consisting of clusters of lights on lamp posts. The wires leading to these are in Patterson cables, led up through the posts. The dynamo was running, and Mr. Charles B. Schultz, an expert, thoroughly competent, in the employ of the Western Electric Company, was adjusting one of the lamps which had gone out. Receiving a slight shock, he called for a stick with which to close the lamp switch. Having done this, by some unexplained method he apparently "got caught" again, when he grasped the frame of the lamp, which, swinging toward him, made him lose his balance. The engineer, regardless of injury to the dynamo, shoved the switch, when, or about which time, Schultz, who weighed some 230 pounds, fell, crushing his skull, producing instant death. The line was well insulated, the test made the next day, showing over 1,000,000 ohms insulation resistance—a proof that the accident was not caused by ground leak, and the lamps were not extinguished until shut off by the engineer. The inquest, post-mortem, failed to show any definite proof of injury from electricity. The hands were unscorched, the internal organs intact, and only the watery condition of the blood was adduced as proof of possible death through a shock. The probability is—and this was about the finding of the jury—that he was partially paralyzed by a shock which would not have proven fatal, and fell from inability to control his movements, the crushing of his skull producing death. It is highly probable that he would have recovered but for his fearful descent from a twelve-foot ladder to the stone pavement, which he struck with his head. Mr. Baron, who stood at the foot of the ladder, did all in his power to save him, and was himself thrown from a round half-way up or so, but was fortunately uninjured.

Chicago.

Mr. F. R. Wells, superintendent of the Bell Telephone Manufacturing Company, of Antwerp, arrived this week from Liverpool *via* steamer Panovia, and will remain a few days with electrical friends.

Mr. F. B. Converse, of Guatamala, general agent for Central and South America for the Thomson-Houston Electric Light Company, is in New York, and will remain until May 20th. There is a growing demand for the electric light in the country he controls.

The daily press in speaking of the rates charged by the telephone companies complain that they are exorbitant, and characterize the company as a grinding monopoly.

Now let us inquire a moment what the rates are which this "grinding monopoly" has established, and what is the character, quantity and quality which it is giving, directly and indirectly, in return for them. In New York the price is $150.00 per annum, say 50 cents per working day. This gives the use of the necessary instruments, the care of the same, the construction of line and their maintenance, and the right at any time, day or night, Sunday or week-day, to call for and talk with any one of five thousand subscribers. When one considers the time, trouble and expense which is thus saved, it will hardly be argued that the figure charged is a high one. Of course, if a man has no occasion to talk with any considerable number of the five thousand subscribers, and no considerable number of them have any occasion to talk with him, it would be much better for him to keep out; but if there be a dozen or even less of them with whom he is likely to want to communicate with, promptly and satisfactorily from time to time, and a dozen others who are likely to want to call him up in the same way, the fifty cents a day, if his business is of any importance whatever, amounts to very little, compared with the advantage which it secures.

But New York, on account of the number of subscribers, the extent of territory covered, and the expense of doing business, has a higher rate than any other city in the country, except Chicago, where it is the same. In Boston the annual charge is $120, or about 33 cents per day for every day in the year. In cities of less size it runs all the way from $100 to $36 per annum, and in the majority of cases it is very much nearer the latter figure than the former.

Now we ask, *considering the service rendered*, considering the value of the telephone in saving the waste of time, considering its value in emergencies, when prompt communication often has a value which cannot easily be expressed in dollars and cents, can it be said that the rates which the public pays for the privilege of using the telephone are such as to warrant one in calling the Bell Telephone Company a "grinding monopoly."

It is to be borne in mind that the profits of the company, the dividends which its stockholders receive, the price which their stock commands in the market, are nothing whatever to the purpose. The sole question is whether the Bell Telephone Company uses its exclusive privileges, granted it by the Patent Laws, and confined to it by the courts in such a way as to take from the public unreasonable compensation for the services which it renders.

Telephonic News

*** "Now is the time to subscribe" is the one expression that the daily press and the telephone companies agree on. "The time for disappearing"—underground—is what they split on.

*** Major J. M. Brown, special agent of the American Bell Telephone Company, has returned from an extended sojourn in the South, and reports the telephone business improving at many points.

*** The increase of 250 subscribers since January 1 is the satisfactory result achieved by the Long Island & New Jersey Telephone Company. There are now 2,400 subscribers, in round numbers, in Long Island.

*** The annual meeting of the stockholders of the Erie Telephone Company will be held in New York, June 1, at 10 A. M. A thorough reorganization of the company, with some practical telephone men at the head, would seem to be in order.

*** You must not swear at your telephone in Ohio. The Supreme Court recently rendered a decision that a telephone company had the right to remove a telephone from a subscriber's premises because the subscriber had used profanity through it.

*** Supt. Hibbard, of the Wisconsin Telephone Company, has ordered a reconstruction of the telephone exchange at La Crosse, Wisconsin, placing Mr. M. E. Trucks in charge of the work. Prompt and satisfactory service is promised, and if the subscribers will be patient until the reconstruction, with all its annoyances, is completed, they will, no doubt, receive it.

*** The telephone exchange at Richmond, Va., increased 42 subscribers during the month of March, making a total of 400 subscribers in this city of 60,000 inhabitants. The exchange is enjoying a healthy growth, largely due to the efforts of C. E. McCheer, superintendent of the first division of Southern Bell Company, which includes Virginia and North Carolina.

*** The executive committee of the New England Telephone Company, at a meeting held on Friday, voted to curtail expenditures in the matter of reconstruction this year. It has been estimated that $170,000 would be required for this purpose during the calender year, but this amount will probably be reduced about one-half. The net earnings for the month of February are stated to be about $12,000.

*** The Paris sewers, which have been utilized for various purposes, are being made the receptacle of the lines of telephone wires. The telegraph wires were placed in the sewers in 1880, water pipes for household and sprinkling purposes are also laid there, besides a pneumatic tube used for the transmission of messages, and a smaller pipe which transmits the air pressure for the system of pneumatic clocks distributed throughout Paris.

*** Telephone lines are being extended in Scotland to a degree that proves our Highland friends to be awake to the advantages of the modern conveniences. The National Telephone Company, Limited, have recently opened exchanges at Hamilton and Larkhall, and have extended a toll line from Dundee, which previously stopped at Carnoustie, to Arbroath. At the formal opening of the new office a number of merchants participated, and the success of the experiments made with the telephone was toasted, the manager, Mr. J. D. Miller, acknowledging for the company. Should a formal opening occur on this side every time a new office is started, or trunk line extended, some of our enterprising companies would be compelled to have a new official with title of "General Responder to Toasts"

*** It is stated by the Boston papers that the Executive Committee of the New England Telephone Company has recently inspected the accounts for the nine months ended January 1, 1885, for which period the company will make its annual report to the stockholders. For the nine months the figures are understood to be as follows:

Gross earnings	$681,186.80
Expenses	519,971.02
	$161,215.78

The above expenses include $33,530.80 for reconstruction and $68.873.92 for repairs and maintenance—a total of $102,404.72. Besides this, there was spent for new construction in the nine months, not put into the expense, $154,723.96. This is a total of $257,000 for construction, repairs and reconstruction in nine months, and does not include a special account of nearly $35,000 spent for the reconstruction of the Boston station. These figures convinced the Executive Committee that the construction expenditures were at present rather large, and estimates were called for as to the amount actually needed in 1885. It was then figured that if the company in 1885 reduced its construction and reconstruction to the absolute necessities of the business, $125,000 would cover both accounts, this sum to be about equally divided. No action, however, has been taken. The net earnings of the New England Telephone Company for the calendar year of 1884, aside from new construction, but after charging all reconstruction and repairs to operating expenses, figure at about $225,000. For 1885 it is estimated that the net earnings upon the same basis will be from $250,000 to $275,000. If they are the larger figures, and only $75,000 is expended for new construction, there will remain about $200,000 for reduction of the floating debt and dividends upon the capital stock of the company, which at present stands as follows: $12,000,000 authorized, $10,394,600 issued, and $6,591,600 dividend drawing. The remaining $3,803,000 of capital stock is owned by the parent company, and becomes gradually dividend drawing until 1890 when all the capital will be entitled to participation in whatever dividends are declared. The Bell Telephone Co. has agreed to give the odd or ninth director to the other stockholders, who elected officers at their annual meeting in New York, May 3. For a year past the officers of the Bell and New England companies have been studying the rental problem to ascertain how the New England Company could be equitably relieved of some of its burden, and the plan now is, although no action has been taken thereon, for the Bell Telephone Company to make a reduction from the $14 royalty charged for instruments in New England country districts. This plan, it is estimated, will be a concession to the New England Company of about $30,000 per year in telephone rentals. There is no plan to bond the New England Telephone property and pay dividends, but the $184,000 bills and accounts payable, which was the gross floating debt of the New England Telephone Company, January 1, 1885, can be liquidated under good management and good fortune the present calendar year, and something of a dividend would be paid out of the net earnings of 1886.

Dr. Ochorowicz's Loud-Speaking Telephone.

An endeavor has, for a long time, been made to devise a telephone system that should transmit speech to a distance with sufficient intensity to be heard within a certain radius around the apparatus, and without the necessity of applying the receiver to the ear.

The problem has already been partially solved by Mr. Gower, and by Mr. Edison in his electro-motograph. Dr. J. Ochorowicz has recently presented a still completer and more perfect solution to the International Society of Electricians and the French Society of Physics.

In the construction of his apparatus the inventor had especially in view the application of it to the auditorium of theaters, for which, in fact, it appears to be well adapted. The system, as a whole, includes a transmitter of variable resistance, the special arrangement of which Dr. Ochorowicz keeps secret; and of a magnetic telephone receiver, whose principal features are shown in the annexed cut. This receiver, which is identical with Bell's, since it contains the three essential parts of that instrument (magnet, bobbin, and vibrating disc), differs from it, however, by important modifications of form, to which it owes its remarkable power.

The magnet consists of a hollow steel cylinder, containing a longitudinal slit about a fifth of an inch in width. To the center of this are fixed two small soft iron cores, upon which are placed two bobbins that are traversed by the undulatory current modulated by the transmitter. These two bobbins are inclosed in a sort of elastic metallic box, formed of two thin sheet iron discs held parallel by their external edges upon a cylinder. The lower plate, which is firmly affixed to the magnet, contains two apertures, which allow the iron covers to pass freely.

The magnetization of these cores keeps the box thus formed in a state of tension, and the two ends of sheet-iron slightly depressed and attracted toward each other. The effect of the variations in the undulatory current which is traversing the bobbins, is to increase or diminish the magnetization

THE OCHOROWICZ TELEPHONE.

of the cores, or, we might say, to cause the *flow of force* to vary. The box becomes compressed or dilated under the action of such variations, and vibrates *in its entirety*.

Thus is explained the power of a receiver which, connected with Dr. Ochorowicz's special transmitter, has permitted speech, song and music to be heard throughout the entire hall of the Geographical Society—a room capable of holding as many as five hundred persons. The telephone receiver is capable of operating as a transmitter. Speech is, in this case, transmitted with less power, but it has still enough intensity to be easily and very distinctly heard at a yard or two from the receiving apparatus.

In the microphone transmitter, employed by Dr. Ochorowicz, heat appears to play a certain role, if we are to judge by the fact that all the experiments repeated before the Society of Electricians, February 4, succeeded except the last. Dr. Ochorowicz attributes this result to the fact that it is necessary for the microphone to be warm in order to be regulated. As soon as it ceases to be so, the regulation is destroyed, and is not effected again until a new heating occurs. Since, in the experiments mentioned, Leclanche piles were used, these became polarized after a certain time, and allowed the receiver to get cool. Such an inconvenience is remedied by the use of Daniell and Lalande and Chaperon piles, or of accumulators. It must be also noted that, in Dr. Ochorowicz's system, transmitting is done *directly*, without the intermedium of an induction coil acting as a transformer.—*La Nature.*

There was a rumor the other day that a strike of telegraph operators was to occur in a very few days, but all knowledge of this was denied by both operators and officials of the telegraph companies in this city.

The Telephone at Long Distances.

If we had been told only a few seasons ago that in the year of grace 1885 we should be able to carry on conversations along a wire, not merely between two distant points of one and the same city, but between two cities and even between two countries, we should have shrugged our shoulders and accused such pretensions of folly.

Yet this pretension has been realized; and, although all attempts hitherto made to utilize the telegraph wires for the transmission of speech to a distance seemed to remain in the stage of interesting experiments without any practical utility, our learned countryman, M. Van Rysselberghe, has had the good fortune to find the solution of this important problem.

It is not without some national pride, says *La Chronique des Traveux Publics*, that we have seen this prodigious invention inaugurated between Brussels and Antwerp, *i. e.*, exactly at the same place where, thirty-eight years ago, on September 9th, 1846, the first telegraph line on the continent was opened to the public.

Thanks to the active and devoted assistance of the staff of the Administration of Telegraphs, and thanks, also, to the speed with which the apparatus has been supplied by the constructors, who are at the same time the licensees under Van Rysselberghe's patents, the Belgian public can already correspond between Brussels and Antwerp, Brussels and Ghent, and Liege and Verviers. In a few weeks all the principal centers of Belgium will be able to correspond telephonically among themselves along the telegraph wires, and it will be the same without delay between Antwerp and Rotterdam, as well as between Brussels and Paris, Madrid and Lisbon.

Van Rysselberghe, who is at present installing his system in Spain, has just seen it officially inaugurated between Madrid and Burgos, over a length of more than 250 kilometers.

It is known already that applications of the same system have been successfully made in Portugal, France, Holland and America, and all other countries will not hesitate to follow the example thus set.

The proof lies in the fact that everywhere—in England, in Germany, and even in France—there is a demand for the construction of special lines for the inter-urban telephonic service.

But this is precisely what was the case in Belgium before the Van Rysselberghe system was known. It may not be useless to remember that, when a demand of credit was addressed to the Chamber of Representatives for the construction of 600 kilometers of telephonic lines, the Central Section, through its reporter, M. Callier, proposed to apply the Van Rysselberghe system to all our telegraphic lines.

"The expense of this appropriation," said M. Callier, "is estimated at 150,000 francs. The cost of an equivalent net, if specially constructed for the telephone, would have been three millions."

We add that it would have involved, further, an annual outlay of 300,000 francs for maintenance, this being generally estimated at 10 per cent. on the first cost of the net of lines.

These considerations induced the Minister of Public Works to approve, December 14th, 1883, the convention by which Messrs. Mourlon undertook to furnish at an early date all the materials necessary for the appropriation of the 30,000 kilometers of wires of which our telegraphic net consists.

We know how the initiative of our Government has been crowned with success, and we are surprised that at the moment when the French Government is making experiments with the Van Rysselberghe system, which succeed perfectly, certain journals, such as *La Lumiere Electrique* and the *Bulletin International des Telephones*, complain of it to Minister Cochery, and recommend to him the construction of special lines, the cost of which we have just seen.

We regret to mention that these same organs have confined themselves, in defending their view, to denying the results ob

tained by Van Rysselberghe's system between Rouen and Havre—results unanimously proclaimed not only in the press of Rouen, but in the principal Paris journals, including the *Figaro*, and in letters published by Raymond, the chief engineer who directed all the installations.

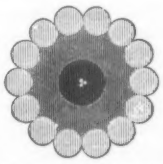
Further, *La Lumiere Electrique*, whose editor, M. Cornelius Herz, cannot console himself, doubtless, over having lost an important law suit against Van Rysselberghe, has thought well to profit by the latter being compelled, on account of his journey to Spain, to suspend for the moment his negotiations with Cochery, by announcing that these were broken off, though the correspondence exchanged on this occasion proved the contrary.

Finally, the *Bulletin International des Telephones*, in its last issue, reproaches the Van Rysselberghe system with having attracted lightning, though there appears to have been merely a high wind which overturned the telegraph posts. However this may be, if the editor of that journal had taken the opportunity to see or even to read the description of Van Rysselberghe's apparatus, he would have been convinced that these, being each fitted with a lightning rod devised by the same inventor, cannot be responsible for the facts mentioned.

Decidedly, if Van Rysselberghe's system encounters no more serious obstacles than those just mentioned, we have no fears concerning its success.—*London Electrical Review.*

The Sunset Telephone-Telegraph Company.

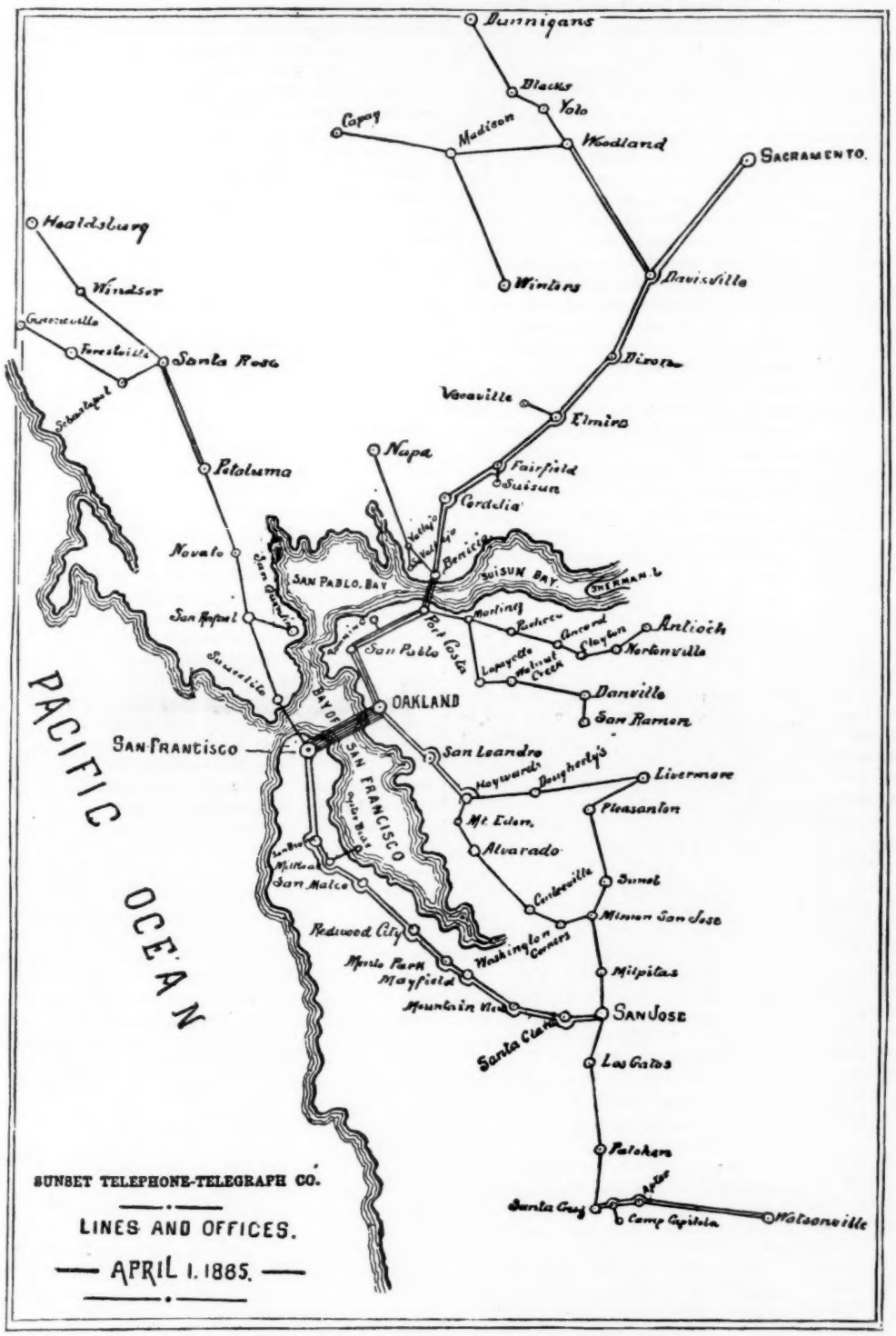
As will be seen by the map published in this issue of the REVIEW there is a very complete system of telephone toll lines centering at the Golden Gate, where Mr. Jno. I. Sabin is winning honors and shekels by his excellent management of the Sunset Telephone-Telegraph Company. While the map is not claimed to be geographically correct to a hair, yet it serves to illustrate so that all points reached by telephones can be seen at a glance. There are fully 800 miles of wire included in the system, the longest line extending from San Francisco to Watsonville, a distance of 210 miles. The line to Healdsburg, including Gurneyville, 94 miles in all, shows good earnings (about $5, per mile per month) and is most satisfactory in its working. The "glorious climate of California" seems to lend its friendly aid to the telephone service. All the "extra-territorial" lines are kept comfortably busy, and notwithstanding the fact that the rates are probably the highest in the country, the service is such that subscribers are satisfied and do not



DAY'S KERITE SUBMARINE CABLE.

object to paying a toll that enables the telephone management to maintain the service at its best.

One of the Hotchkiss submarine cables has been in use by this company for nearly a year past, and is giving perfect satisfaction. The kind of cable used is illustrated herewith, 3 No. 18 conductors, $\frac{3}{32}$ insulation, and fourteen No. 8 armor. The cable is used to cross the Golden Gate, is nearly two miles in length, and works "bully," in the expressive parlance of the Pacific coast.



SUNSET TELEPHONE COMPANY'S EXTRA-TERRITORIAL LINES.

The Telegraph Against Criminals.

The hunt for Maxwell, the supposed murderer of Arthur Preller in St. Louis, has called attention anew to the slight chance a criminal has of escaping now-a-days if intelligently pursued. Maxwell is supposed to be on board a ship bound for Auckland, New Zealand. The dispatch which will secure his arrest at that place, if he does not leave the ship at Honolulu, will take a route few people will imagine. Its course is thus described: From St. Louis the message will go to New York, thence to Cape Breton, and thence by cable to Valentia, Ireland. From Valentia it will cross Ireland, pass under St. George's Channel by cable, be repeated to London, and thence by cable again to Lisbon, Portugal. It will next go by cable under the Mediterranean to the Island of Malta, and by another submarine line to Alexandria in Egypt. It will reach Suez by land, and then go by cable under the Red Sea to Aden in Arabia. Another cable will take it to Bombay, India. Thence it will go to Penang, in the Malay peninsula, again by cable to the Island of Java, from which place another cable will convey it to Port Darwin, in North Australia. Crossing Australia to Sydney, it will go through the South Pacific cable to Wellington, New Zealand, whence a land line will carry it to Auckland. The cost of the message will be $3.34 a word, a total, if the description be made full, of several hundred dollars. The steamer on which Maxwell sailed will reach Auckland May 1, so that officers will be awaiting the murderer for weeks before his arrival. A Pacific cable connecting America with the Sandwich Islands and Asia is the only thing needed to make the circuit of the world complete, and to leave a criminal whose description is known practically no place of concealment in a civilized land.

The telephone is getting very popular in New Zealand. There are nearly 1,100 subscribers in the new colony. The list continually goes on expanding, and a new switch-board is being prepared for Auckland and another for Wellington, while one has just been supplied to Dunedin. There are also about 100 country stations where the telephone is used, instead of the Morse instrument, for telegraphic purposes.

TELEGRAPHIC

.... In the bright lexicon of the district-messenger youth there is such a word as snail.

.... The Baltimore & Ohio Telegraph Company has formed a distinct organization under the laws of the State of Indiana, with a capital stock of $100,000, in order to extend the lines in various directions throughout the State.

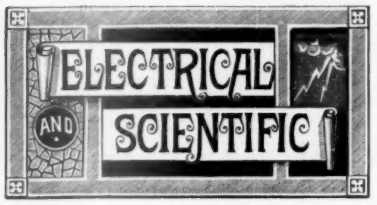
.... The statement is again made that the Baltimore and Ohio telegraph line will certainly be extended from Chicago to St. Paul and Minneapolis this year. A St. Paul newspaper asserts that a few weeks ago the Baltimore & Ohio made plans and specifications for the construction of such a line and invited bids privately. These invitations for bids have been responded to by parties from different sections, and are now under consideration at the headquarters of the Baltimore & Ohio Company. That company's practice is to build its own lines, and the probability is that the bids will be rejected, and that the Baltimore & Ohio will begin the construction at an early date, doing the work with its own force; though this point is not fully settled.

.... The patent on the Gold & Stock printing machine having expired on the 14th inst., the Commercial Telegraph Company has resumed the use of the double wheel arrangement, and now for competition. If the latter company could extend its field of labor to Boston subscribers to the ticker would not long have to pay $1 per day for service which costs only $10 per month in New York.

... Judge Shipman, sitting in the United States district court on Saturday last at Hartford, Conn., appointed General Edward Hartland of Norwich, Conn., receiver of the American Rapid Telegraph Company. The bond is fixed at $50,000. The decision fixes the powers of the receiver. The petition for the appointment of a receiver was made by the Boston Trust and Safe Deposit Company.

.... The Gold and Stock Telegraph Company has requested the Commercial Telegram Company to furnish a bond in the amount of $275,000 as security, pending an accounting, for damages sustained by the former company growing out of the infringements of the Calahan patent. Should the Commercial Company accede to this proposition and furnish the required bond, it is understood that no suits will be brought against its customers and subscribers.

The Western Union people say that it is impracticable to bury their wires, and that they are going to test the case in the courts, claiming that the act obliging them to put the wires underground is unconstitutional. They also say that the service would suffer very much, and that the number of branch offices would have to be largely reduced.



* * Last year we bought $8,000,000 worth of rubber from Brazil. Next to coffee and sugar, rubber holds the third place in Brazilian exports, and is in greater demand in this country because of its superior quality. It is being used now in countless ways, and in late years its consumption has doubled.

* * An electrician in New York is completing the details of a machine for undercutting coal It consists of a series of augers driven by an electric motor. A Philadelphia banker is at the head of the enterprise, and the machine is to be tried in the near future, in a mine at Sharpsburg, Pa.

* * The English Government has ordered three 110-ton guns, and one of these is to be delivered in October next, another in January, and the third in April, 1886. The price per gun is £19,500; the projectile is 1,800 lbs.; the charge is 900 lbs. of cocoa powder; the muzzle velocity is 2,020 feet per second; the maximum powder pressure is 17 tons per square inch. The velocity and pressure are, of course, only estimated, although they are based on the experience gained with the Italian guns.

* * The proceedings of the recent meeting of the American Institute of Electrical Engineers, which have just been published, contain an interesting debate on the subject of underground wires. Mr. W. M. Callender, one of the ablest members of the institute, read an important paper favoring the project of laying underground wires; and in the course of discussion, Mr. Preece, the eminent English electrician, remarked that the question of aerial wires and underground wires was not a problem to be solved; it was a problem that had been solved; and whether a wire be put under ground, or whether it be put above ground, was simply a question of pounds, shillings, and pence.

* * Dr. Torrey, United States Assayer, received a few days ago a meteorolite, which fell a few months since upon a slope of the Glorieta Mountains, near Sante Fe, N. M. The visitor from space, which burst into three fragments in falling, weighs 300 lbs, and is composed almost entirely of metallic iron and nickel. The sides present a fibrous appearance, while the bottom is mottled and bronzed in color. While lying at Sante Fe an effort was made to split one of the fragments, but all the steel wedges employed were broken in the attempt. The meteorolite, which is nearly the size of the famous one at the Smithsonian Institution, has been disposed of to one of the great European museums.

* * M. A. Crova has designed a photometer for measuring luminous sources of high intensity. It is based upon the principle that when a translucent screen is placed in a uniformly illuminated field, in a direction normal to the incident rays, each point of the screen may be regarded as a luminous source, and transmits light, the intensity of which depends upon the nature of the translucent material, in accordance with a law which also varies with the material, but in every case the rays diffused in a direction closely approaching the normal are equal in intensity. If there is placed behind the diffuser an opaque screen with an opening, the size of which can be varied at will, the intensity of the light normally emitted by this opening is proportional to the intensity of the luminous field on which the diffuser is placed, to a coefficient which depends on the nature of the translucent substance, and to the area of the opening, and varies inversely with the square of the distance. M. Crova employs a Foucault's photometer, one-half of the screen being illuminated by a standard light of one Carcel lamp placed at the end of a blackened tube one meter in length, whilst the other half is illuminated by the light to be examined. The latter passes down a tube which is movable on a graduated circle fixed at right angles to the axis of the first tube. At the further end of this tube there is a rectangular opening, the breadth of which remains constant, whilst the length can be varied by means of a micrometer screw. This opening is placed against the diffuser, and the size of the opening is altered until the two halves of the screen of the photometer are equally illuminated. For intensities up to 400 carcels the diffuser is made of ground glass, whilst for higher intensities opal glass is used.

A New Field for the Atlantic Racers.

The passenger season on the Atlantic, which has just opened, will not, from a traveler's point of view, be such a brilliant one as was anticipated a few weeks ago. All the arrangements of the leading lines have been completely thrown out of joint, and the *elite* of the Atlantic racers have been withdrawn from service on the "great ferry." Ship-owners were quite alive to the fact that the Afghan crisis pointed to the hiring of transports and profitable employment for superfluous tonnage, but none of them seem to have imagined that either the British or Russian government had an eye on the costly coal-consumers and swift-floating hotels engaged in the Atlantic trade. The unexpected has, however, come to pass, the admiralty having chartered the Cunard liners Etruria and Oregon, the Guion liners Alaska and Arizona, and the National liner America. All these magnificent ships are now in the hands of the British authorities, and are being rapidly transformed into armed cruisers and transports. As the season had not been fairly inaugurated no difficulty was experienced in completing the negotiations. A week or two later some of the ships most urgently wanted might have been on the other side of the Atlantic, or, worse still, in the possession of the Russians, for it is an open secret that the government of that country was making efforts not to hire, but to purchase, several of these fast boats. The chartering of the Atlantic racers will inevitably bring about two results. In the first place the traveling public will be disappointed, for a time at least, for they have become accustomed to these wonderful products of the naval architect and the shipbuilder, and they are interested in the speed problem. Great preparations had been made for the season, and it was anticipated that there would be another break in the time record and an additional impetus given to the rivalry that prevails in perfecting the traveling facilities between Liverpool and New York. How long the chartered vessels will be required by the admiralty cannot at present be determined, but it is to be feared that the hopes that were centered in 1885 will have to be deferred till next season. The difficulties in Afghanistan may remain in a semi-acute stage for a long time, or the points at issue may be peaceably settled by the Afghan Boundary Commission, but until a definite settlement is effected and all symptoms of danger pass away the British government will undoubtedly retain such useful auxiliaries as the Atlantic liners. But while the traveling public will for a time be inconvenienced, the steamship companies will be gainers, and the freight market will be improved. The season opened with but indifferent prospects, owing to the poor steerage rates, low freights, and an over-abundance of competing tonnage. The withdrawal of several of the largest and most expensive vessels has altered matters materially. For the ships chartered by the government the steamship companies have procured their own terms, while the Atlantic trade will be spread over fewer hulls and will to some extent be more lucrative. The pressure of competition is relieved, and the shareholders of the Atlantic companies are likely to see dividends earned during the present year. This unexpected change for the better has produced joy in shipping circles, so long accustomed to losses and unremunerative ventures, and there can be no doubt that the season's prospects are much brighter now than they were some time ago. The engagement of Atlantic liners for the purpose of converting them into armed cruisers has created no surprise amongst nautical people. Quite the reverse. All these ships were, in fact, designed to meet admiralty requirements, and entitle them to be placed on what is known as "the list of vessels available for war purposes." Armed with a few guns, they would be able to make havoc in the mercantile marine of a hostile country, while their great speed renders them tolerably safe from attacks by armor clads. Indeed, many competent authorities are of opinion that the fast vessels of the present day require but little alteration to make them self-protective. At any rate, the shipping companies, when investing in these huge, costly ships, reckoned on the possibility of finding profitable employment for them during a war crisis, and the present difficulties with Russia are only enabling them to realize their projects and to earn money on their great investments.

Give Us Our Own Atlantic Cable.

Brother Foote, editor and proprietor of the Montreal *Shareholder*, one of the brightest papers printed across the border, says:

"Shall we never learn sufficient wisdom to see the national danger of getting our cable despatches from foreign and hostile sources alone? Now they come only from American agencies established in London, the correspondents being in all cases aliens, and in not a few declared Fenians. They are made up expressly to pander to Yankee tastes and prejudices, and come on thence to Canada without being subjected to any excision of their offensive features, and thus slowly, yet most surely, undersap our own national interests and build up among the population sentiments equally hostile to the Dominion and the Empire. We not only, too, thus fail to get the truth as a reliable incident of all this expensive cabling, but we receive such contradictions and general muddles that no one can make a safe guess at what is even the real situation abroad in times of great anxiety—such as exist to-day. From every point of view this unsatisfactory system should be summarily brought to a close, and the two Governments—the Imperial and Dominion—should at once unite upon terms to lay down another cable to be exclusively under their own management and in connection with the national telegraphic land system covering the whole of the United Kingdom. This would at once stop the insidious undermining of our national sentiment now going on here, and would in that aspect alone prove of invaluable service. A few American sympathizers and a gang of unscrupulous gambling stockjobbers of the scaly kind would alone be likely to be found to demur to so salutary a reform, their adhesion to which might easily be contrived to be foregone. If it is indispensable that fiction must accompany telegraphic communications at all, still we might as well make use of the native article. That which is imported is more costly and no better; and those who have closely followed the stories coming over the wires from the Northwest since the present little unpleasantness lately broke out, will at once concede that for able-bodied liars to manipulate the news we need not go beyond the frontier in search of a thoroughly efficient corps. The yarns that come from the West are enough to make the hair of their eastern recipients stand on end—to such an extent that it is fortunate that the fashion of scalping has such narrow local limits. It is a safe assertion that more lies to the yard have come over the wires from the farthest western limit to Montreal in a week than have ever sent a thrill from Maine to California in a month. The native *literateur*, too, stands in puzzled contemplation of the problem that with such a reserved force of first-class romancists, Canada still holds so backward a place as a producer of world-known works of fiction. But, with the wires in the hands of the Government, overland and cable, all this disposition to drawing on the imagination would soon be cured, and really veracious news—good or bad, sweet or bitter—would alone be presented. It would not only come, too, untainted with lies, but would no longer be the vehicle of sentiments which are gradually corroding every proper sentiment of nationality such as alone we ought to cherish, and as we used to do in the old times. By all means let us at least have a sub-Atlantic cable of our own."

How Stockholders May Ratify a Sale of Corporate Property.

In the suit of Reiff *vs.* The Western Union Telegraph Company it was decided, in the Superior Court, that, although the holders of three fifths of the capital stock of a corporation assent to the sale of the corporation property, whether that consent be given in writing or by oral vote, it must be given at a general meeting called for the special purpose of considering the sale. Now comes Judge Andrews, into the Special Term of the Supreme Court, with an opinion adverse to that of the Judges of the Superior Court. In the case of Shaler *vs.* The Automatic Signal Telegraph Company, he holds that the consent of stockholders may be given in writing at their homes, offices, or anywhere else, and that if it is not procured from them in writing, it must be got "by vote at a general meeting duly called." His reason for dissenting from the previous decision is very clear. That decision was based on the legal construction of a printed copy of the statute. He has had before him a copy of the original act, certified to by its custodian, the Secretary of State. In this copy a comma appears between the words "in writing" and "or by vote at a general meeting," etc., while in the printed copy the words "in writing or by a vote" run along without interruption from a punctuation mark, and the words "at a general meeting duly called" are cut off from them by a comma. It is evident, therefore, that the Superior Court Judges decided properly according to the light they had, while Judge Andrews has arrived at a conclusion consonant with the legislative intention.

Magnetic Induction.

Editors of the Electrical Review:

It is gratifying to me to observe that the results of the experiments described in my communication under the above title, published in your issue of 11th inst., has attracted the attention of the President of the "New York Electrical Society," but I regret that he does not touch upon the cause of the fact that the ratio of attraction of an armature changes in such a marked manner with its change of weight, as this fact was what induced me to publish the results obtained, owing to the possible practical applications of the principle; and the fact that the law of squares does not apply to the attraction of armatures was merely touched upon incidentally, as I was well aware that it had been disputed, notwithstanding its reiteration in the text-books.

WM. B. COOPER.

Philadelphia, April 25, 1885.

The Phelps Induction Telegraph.

NEW YORK, April 27, 1885.

Editors of the Electrical Review:

We notice in the last issue of your valuable paper, in an article under the caption, "A Chance for Electricians," reference is made to the Phelps Induction Telegraph Company's system of railway telegraphy in such a manner as to convey the impression that the system is not entirely successful.

The actual facts are that our telegraph system has been in daily use upon the Harlem branch of the N. Y., N. H. and H. R. R. for nearly four months past without a single failure, except at the public trial, February 13th last, referred to in your article, when an accident occurred to the sending key at the terminal station, thereby preventing the transmission of messages to the train, but not interfering with messages sent from the train, which were all received at the terminal station without interruption.

This accident was one not at all affecting the system, but one which might occur at any time in ordinary telegraphic service.

Before and since then our system has been working upon several trains daily without the slightest failure or difficulty, which fact can be testified to by a large number of elec-

tricians and prominent railroad men, who have personally inspected it.

In conclusion, permit us to say we would be pleased to have electricians, and others interested in the subject, visit, at their pleasure, our plant upon the branch railroad of the N. Y., N. H. and H. R. R., upon which the Phelps system is in daily practical operation on trains leaving Harlem River Station at 2.10 P. M. and 3.55 P. M.

Respectfully yours,

PHELPS INDUCTION TELEGRAPH CO.
(CHAS. A. CHEEVER, President.)

We are glad to give prominence to the above communication, and disclaim any intention of discrediting the Phelps telegraph system in the article referred to.

Thorough inspections by numbers of well-known electricians, railroad officials and others have produced only good reports.

On the 25th of last month a delegation from the New York Electrical Society paid a visit to the company's line on the New York, New Haven and Hartford Railroad, of which the following account appeared in the New York *Tribune:*

"Click! click! buzz! buzz! went the instruments on the baggage car attached to the 3.55 P. M. train out of Harlem, on the N. Y. and N. H. road yesterday. The new method of telegraphing to and from moving trains was being exhibited for the edification of the members of the New York Electrical Society.

As the train passed the terminal station, President Van der Weyde threw off a sealed dispatch, which the operator working there picked up and telegraphed to him on the train. Many messages were sent and received. At 4.11 the following dispatch was received:

'No. 13 PARK ROW, NEW YORK.

'This leaves here at 3.40. Telegraph what time it reaches you.

'CHEEVER, Pres't.'

"J. W. English, an operator from the Western Union office who had never seen the instruments before, sent and received several messages.

"'I felt just as much at home as if I were using my own key and sounder in the office.' he said, as he smiled with satisfaction at the result of his trial.

There were two complete sets of apparatus in the car, one working an ordinary sounder and the other a telephone, in which the Morse characters could be distinctly heard, as they were ticked off by the operator at the terminal station. D. M. Adee, special agent of the Metropolitan Telephone Company, put the instrument to his ear and listened to the familiar 'buzz, buzz,' which is the bane of the telephone man's life. 'Well,' said he, 'I've been fighting this thing (induction) all my life, trying to annihilate it, but I never expected to see it harnessed down and made useful.'

"As a test of what could be done, on the return trip from New Rochelle to this city, while the train was running on the other track, at a distance of eleven feet from the main line of wire, which runs along the up track, the instruments were worked and messages sent flying across that chasm with as much ease as if it were an ordinary metallic circuit. The expedition was a success."

The following description of a visit paid by Baltimore & Ohio Railroad and Telegraph officials, appeared in the *Railway Gazette* of the 10th inst.

A most interesting, as well as wonderful, experiment in telegraphy was successfully tried on Wednesday by the Baltimore & Ohio Telegraph Company officials. They succeeded in telegraphing on a railway train while going at the rate of forty miles an hour, by the Phelps induction system. (This system was described in the *Railway Gazette* for February 20, last, page 114.)

"The experiment was conducted by Mr. Phelps, the inventor, and under the direction of the Baltimore & Ohio officials, Major Joseph G. Pangborn, the Assistant General Passenger Agent, and Mr. McLaren, the Manager of the New York City Baltimore & Ohio telegraph offices, went on the car, and Mr. Weaver, the Baltimore & Ohio electrician, remained at the receiving office in New York. The experiment was tried on the Harlem River Branch of the New York and New Haven Railroad. Soon after the train started, and while going at the rate of forty miles an hour, the operator in the car called New York. A direct wire had been furnished through to Baltimore, and into President Garrett's private office in the Central building of this city. The gentlemen in the car awaited the answer with anxiety.

"Soon the instrument began ticking as loudly as in a stationary office.

"New York had responded. The induction system worked. Major Pangborn then indited a telegram to President Garrett, saying that the Phelps' induction was a success. The telegram went direct to Mr. Garrett, and an answer was received by the experimenters on the car.

"'Your telegram has been received by President Garrett in his private office.'

"Major Pangborn then wrote another:

"'President Garrett, I am telegraphing to you on a train going 40 miles an hour, by the Phelps Induction System. The wire in our car is 7½ inches from the wire laid on the ties of the track.'"

A few days since the Vice-President and General Manager of one of the great trunk lines carefully inspected the system, personally transmitting and receiving several messages, and expressing the opinion that the system would prove of great value in the operation of railroads, so increasing the safe capacity of single tracks as to postpone the necessity for double tracking.

We notice that at the last semi-annual meeting of the American Railroad Superintendents' Association, held on the 15th inst., at Richmond, Va., the Phelps system was described and very favorably spoken of by the President of the Association, Mr. William H. Stevenson, Superintendent of the New York, New Haven & Harlem Railroad.

From the abundant testimony given by careful, practical and disinterested observers, there seems to be no doubt that the Phelps system is really a practical working system, and one which railroads in their own interest and that of the public, would do well to consider. It appears to find much favor with railroad managers, and we understand that several important roads are already entertaining propositions for placing it upon their lines.

We are informed by the officers of the company that it is now fully prepared to enter into negotiations with railroad companies for the establishment of the system at once upon very favorable terms.

Electricity Applied to Big Guns.

The revolution which electricity is destined to make in modern warfare is as yet only in its infancy. The latest invention of Mr. Maxim is, however, an earnest of the things that yet shall be. The invention is an electrical training gear, so contrived that by the simple movement of the handle the heaviest gun may be turned by a single man, and with the greatest ease, in any direction. You pull a handle to the right, and the breech of the gun moves to the right; to the left, and it moves to the left. You raise the handle, and the gun is depressed at the muzzle; you depress the handle, and the gun is raised. This training gear was applied a day or two ago to one of the 38-ton guns at Garrison Point Fort, and the preliminary trial showed that one man could train the gun with the greatest nicety. One may expect Providence to be very much on the side of the big guns, when a 38-ton gun comes to be aimed at quickly-moving objects as easily as if it were a pistol or a walking stick.

What Will Burst a Gun.

In bravado a young man placed the muzzle of his fowling piece under the water and fired the charge. The result was the bursting of the barrel near the breach, and the mutilation of his hand. Another placed and held the muzzle of his gun square against a piece of plate window glass, and fired the charge—powder and bullet. The glass was shattered, so was the gun barrel. Another instance was that of an experimenter who had heard that a candle could be fired from the barrel of a gun through an inch-board. He drove a candle into the muzzle of the gun, fired, and the explosion split the barrel almost its entire length, and did not even drive the candle from the muzzle. Still another burst of a gun barrel was caused by the use of wet grass for a wad, well rammed down over a charge of shot. But perhaps one of the most singular exhibitions in this line was a Colt's navy revolver, which some years ago was sent to the factory in Hartford, Conn. This was before the adoption of these pistols to the metallic cartridges, and it is probable that in loading with open powder and ball only a small amount of powder got into the chambers, and the bullet was not propelled with a sufficient force to drive it from the muzzle.

The introduction of fire-alarm boxes, such as are in use in every American city of any size, is proposed in Paris, but is objected to on the ground that evil-disposed persons will tamper with them and send in false alarms. To disprove this, the electrical journals cite the experience of this country to the contrary, and argue that what has stood the test of many years' experience here ought to serve equally well in Paris. To Americans it seems hardly possible that any sensible persons can raise objections to the introduction of anything so manifestly desirable as fire-alarm boxes, but it will do no harm for Americans to remember that they often object to and resist the introduction of new devices quite as important, and throw obstacles in the path of those who seek to introduce them. There is a good deal of old-fogyism in this world, and America has a very liberal share of its own.

It is said that if a light but continuous current of electricity be passed through the neck to the arm, and allowed to flow for some moments, the effect is peculiarly quieting and soothing, and tends to induce sleep. It is claimed that it has been used with success in cases of insomnia, but it has hardly been sufficiently tested, or tried upon a sufficient number of persons to warrant the conclusion that it would operate in this way in all cases. It is true of all remedies that act differently upon different persons, but there is no therapeutic agent of which this is more true than of electricity, and it is far from safe to assume, because it has helped one person in a given direction, that it will help, or even will not injure, another. It is a double-edged tool, and a dangerous one to play with in the matter of health.

—— A large number of signal lamps are being fitted on the Great Western Railway, England, with electric lamps.

—— The Edison Central Electric Co., capital stock $35,000, has been incorporated in Covington, Ky., by Henry Worthington, H. H. Hoffman and Archie Stewart, to establish electric light works.

—— The Anniston (Ala.) Inn is lighted by electricity, the Brush-Swan system being used. Three hundred 20 candle-power (Swan's) incandescent lamps are required. The electricity is furnished by a No. 6 Brush low-intensity dynamo, making 1,160 revolutions per minute, and driven by a 30 horse-power New York Safety Steam Power Company engine, making 305 revolutions per minute. Nearly a ton of copper wire, all of which is cunningly concealed, is required to convey the electricity to the lamps. The chandeliers are of the combination pattern, allowing either electricity or gas to be used at pleasure. They were furnished by Mitchell Vance & Co., of New York. The dining hall is lighted by eight electroliers, of six lights each. Mr. Charles Desmond is the electrician and mechanical engineer in charge. The streets of Anniston are lighted by Brush arc lamps, and arrangements are being made for increasing the number. The Woodstock Iron Company and a number of the other establishments of the city are now using the electric light.

ELECTRIC LIGHT NEWS

—— The Edison Electric Lighting Company of Fall River has declared its first dividend of 1½ per cent.

—— It is stated that thirty-five passenger engines on the Vandalia main line are to be equipped at once with the American electric locomotive headlight.

—— Mr. A. F. Stanley, of the Western Electric Company, for some time traveling for his company in the East, will in future make his headquarters at Chicago. His active, intelligent work will be felt in the electrical field in the West, and secure many new friends for himself and company.

—— The New York Electrical Time Company has been organized, with headquarters at No. 15 Cortlandt Street, the purpose of which is to exploit the electric time in New York, Brooklyn and Long Island. The incorporators are F. B. Knight, J. W. Duxbury and Chas. H. Wright, and the capital stock is $300,000.

—— The first of this month the electric light plant at Elmira, N. Y., commenced operations with the Thomson-Houston system with facilities for arc and incandescent lighting. Mr. D. W. Dunn, the manager, is an enterprising gentleman, and will no doubt provide the Elmiraites with an excellent system of lights.

—— The Dayton (Ohio) Electric Light Company will add another circuit of commercial lights to their already large plant, beginning May 1st next. This circuit will consist of fifty 2,000 candle-power lamps, all of which have been subscribed for, and will be run for the benefit of merchants who close at nine o'clock P. M.

—— The works at the central electric lighting station at Antwerp are being rapidly pushed forward, and it is hoped that everything will be in readiness by the opening of the exhibition next month. The installation consists of 3,000 Siemens incandescent and 100 Gulcher arc lamps; four Naeyer generators of 150 horse-power each, two compound Cockerill engines of 400 horse-power, and four Gulcher dynamos, each giving, at a speed of 280 revolutions per minute, a current of 600 amperes and 65 volts.

—— The latest freak among the young folks is the "electric party." It is held at any house where there is a heavy carpet, and the fun consists in shuffling rapidly over the floor to generate electricity in the person and then discharging it through the fingers, nose or lips against some other person or a metallic object. When two well-charged persons kiss the "snap" may be heard in the next room, and when a young man holds his nose near a gas burner sparks fly from it and ignite the gas. These parties are becoming popular on Murray Hill, grown people taking a lively interest in them, and when the lords of the household come in late with red noses, they say they have been to an "electric party."

—— The electric lamp used for examining General Grant's throat is manufactured by Stout, Meadowcroft & Co., agents of the Edison Light Company. It is mounted on a hard rubber holder, about 7 inches long, having a reflector at the lamp end, by which the light can be thrown to any desired angle. The holder is connected by two silk-covered wires to a small storage battery carried in the pocket of the physician. The light is turned on by simply pressing a small button on the rubber holder, and the quantity is governed by another button convenient to the operator. The lamp is inserted in the mouth almost to the palate, with the reflector above the lamp, which throws the light down the throat. The lamp has no unpleasant heat, and gives a light equal to half a sperm candle. The extreme simplicity of the whole appliance makes it very valuable to the physician and dentist.

ELECTRICAL PATENTS

INDEX OF INVENTIONS FOR WHICH LETTERS PATENT OF THE UNITED STATES WERE GRANTED IN THE WEEK ENDING APRIL 21, 1885.

316,003 Socket, or holder for incandescent lamps: P. H. Brangs, Newark, N. J., assignor to the United States Electric Lighting Company, New York, N. Y.

316,076 System for the transmission of power by electricity: Wm. L. Stevens, Boston, Mass.

316,077 Safety box for electric circuits; Wm. L. Stevens, Boston, Mass

316,088 Incandescent lamp holder; Edward Weston, Newark, N. J., assignor to the United States Electric Lighting Company, New York, N. Y.

316,089 Regulator for dynamo-electric machines; Edward Weston. Newark, N. J., assignor to the United States Electric Lighting Company, New York, N. Y.

316,090 System for the transmission of power by electricity; Edward Weston, Newark, N.J , assignor to the United States Electric Lighting Company, New York, N. Y.

316,091 Electro-magnetic motor; Edward Weston, Newark, N. J., assignor to the United States Electric Lighting Company, New York, N. Y.

316,092 Electro-magnetic motor; Edward Weston, Newark, N. J., assignor to the United States Electric Lighting Company, New York, N. Y.

316,093 Electro-magnetic motor; Edward Weston, Newark, N. J., assignor to the United States Electric Lighting Company, New York, N. Y.

316,094 Incandescent lamp; Edward Weston, Newark, N. J., assignor to the United States Electric Lighting Company, New York, N. Y.

316,095 Electric incandescent lamp bracket; Edward Weston, Newark, N. J., assignor to the United States Electric Lighting Company, New York, N. Y.

316,096 Electrical switch, or circuit controller; Edward Weston, Newark, N. J., assignor to the United States Electric Lighting Company, New York, N. Y.

316,097 Switch, or circuit-breaker for electric circuits; Edward Weston, Newark, N. J , assignor to the United States Electric Lighting Company, New York, N. Y.

316,112 Electric clock movement; Julian E. Carey, New York, N. Y.

316,125 Telegraphic transmitting apparatus; Patrick B. Delany, New York, N. Y., assignor to the Standard Multiplex Telegraph Company, same place.

316,126 Receiving apparatus for synchronous telegraphy; Patrick B. Delany, New York, N. Y., assignor to the Standard Multiplex Telegraph Company, same place.

316,133 Telephone transmitter; Moses G. Farmer, Newport, R. I.

316,139 Apparatus for the transmission of an electric current to moving objects; Louis Goldberg, Love Lane, London, and Alexander L. Fyfe, Loughborough Park, County of Surrey, England.

316,143 Induction machine; Paul Haerry, New York, N. Y.

316,183 Electric alarm and signal; Henry C. Roome, Jersey City, N. J.

316,201 Railway signaling apparatus; Charles D. Tisdale, Boston, Mass., assignor of two-thirds to John D. Gould, New York, N. Y.

316,204 Microphone; Henry E. Waite and Samuel H. Bartlett, New York, N. Y.

316,205 Magneto-Telephone; Henry E. Waite and Samuel H. Bartlett, New York, N. Y.

316,206 Magneto-Telephone; Henry E. Waite, New York, N. Y.

316,238 Relay for telephone systems; Joseph H. Clarke and George W. Willard, Providence, R. I.

316,240 Electric arc lamp; Ledyard Colburn, Birmingham, Conn., assignor of one-half to Richard R. Colburn, same place.

316,260 Telephone; Edwin T. Greenfield, New York, N. Y., assignor of one-half to the Holmes Burglar Alarm Telegraph Company, same place.

316,302 Filament for incandescent electric lamps; Wm. Stanley, Jr., Englewood, N. J.

316,316 Electric driving apparatus for centrifugal machines; Alexander Watt, Liverpool, County of Lancaster, England.

316,317 Electric driving apparatus for centrifugal machines; Alexander Watt, Liverpool, county of Lancaster, England.

316,354 Coil for induction and other electrical apparatus; Lucien Gaulard and John D. Gibbs, 18 Warwick Street Regent Street, County of Middlesex, England.

316,360 Electric pendulum clock; Frederick Haenichen and Otto Haenichen, Philadelphia, Pa., assignors to themselves and Oscar Seebass, New York, N. Y.

316,376 Electric burglar alarm; Frank G. Lyon, Jersey City, N. J., assignor to the Holmes Electric Protective Company, New York, N. Y.

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